THE IRON AGE

THE NATIONAL METALWORKING WEEKLY October 19, 1950

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h shield on one for protection ust abrasive dirt.

With shields on both sides to keep dirt out and lubricant in.

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A standard New Departure single row ball bearing may be had with about a dozen different combinations of seals, shields, snap rings, etc., to simplify mounting, lubrication or enclosure—in short it may be had with the equipment to do each specific job best.

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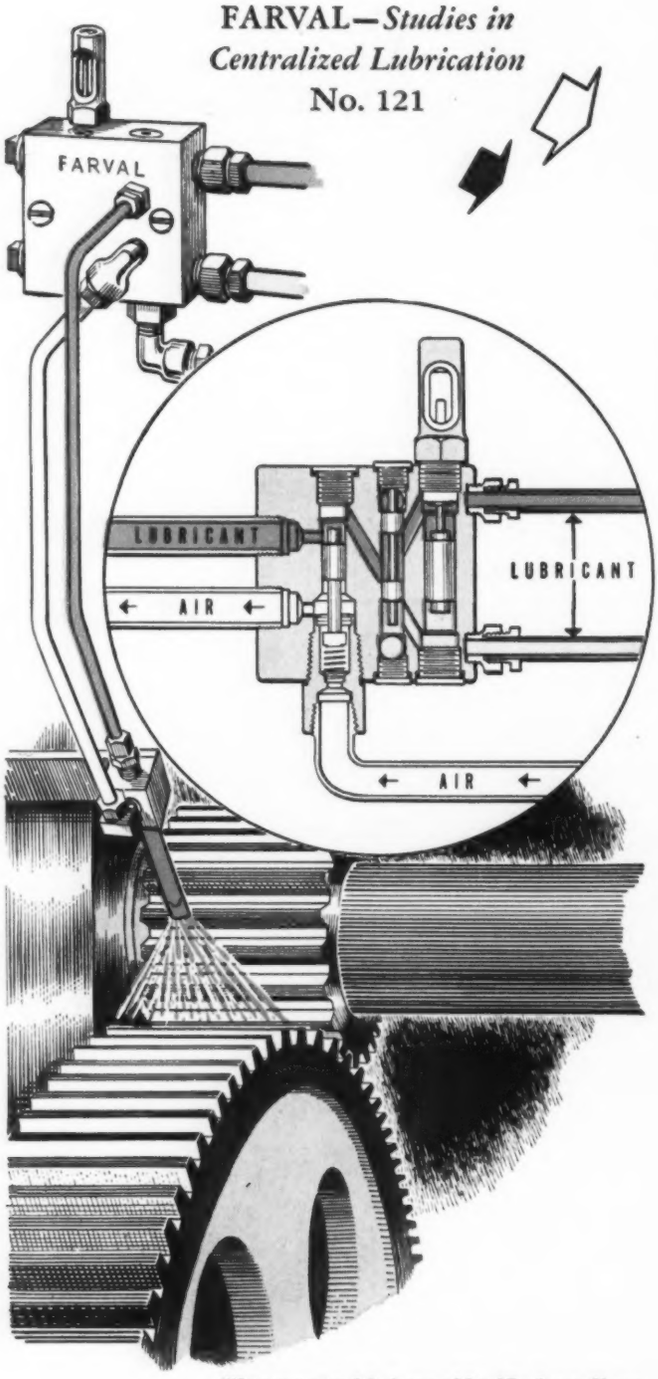
NEW DEPARTURE • Division of GENERAL MOTORS CORPORATION • BRISTOL, CONNECTICUT • BRANCHES IN ALL PRINCIPAL CITIES

FARVAL—*Studies in Centralized Lubrication* No. 121

New Farval Spray Valve

meters lubricants to slide surfaces and open gearing



When you attend the Iron and Steel Engineers Show at Cleveland Public Auditorium, Sept. 26-29, be sure to stop at Farval Booths 244-245-246 to see this new Spray Valve in operation.

CONTROLLED spraying of lubricant on open gearing, slide surfaces, etc., is practical with the new Farval Spray Valve.

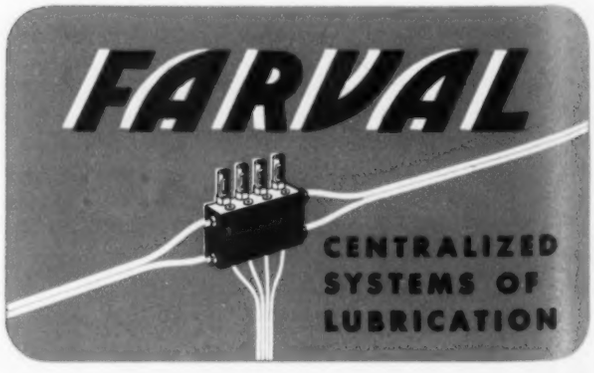
By an ingenious adaptation of the familiar Farval Dualine Valve, either grease or oil is sprayed through a nozzle—on any desired area, in any desired amount, and at any desired interval. The new spray valve can be added at any point in a regular Farval Dualine System where compressed air is available—or a complete system may consist entirely of spray valves, served by either manual or automatic pumping unit.

Compressed air from the supply line is directed through the spray valve, which meters air to the delivery nozzle just as lubricant is metered. By a unique arrangement, the lubricant valve also turns on and shuts off the air. Thus the quantity of air used is limited to the amount needed to spray each delivery of oil or grease, without exhausting or reducing pressure. Positive cut-off of lubricant by the Farval valve after each delivery eliminates bleeding from the nozzle—no waste, no mess, no trouble.

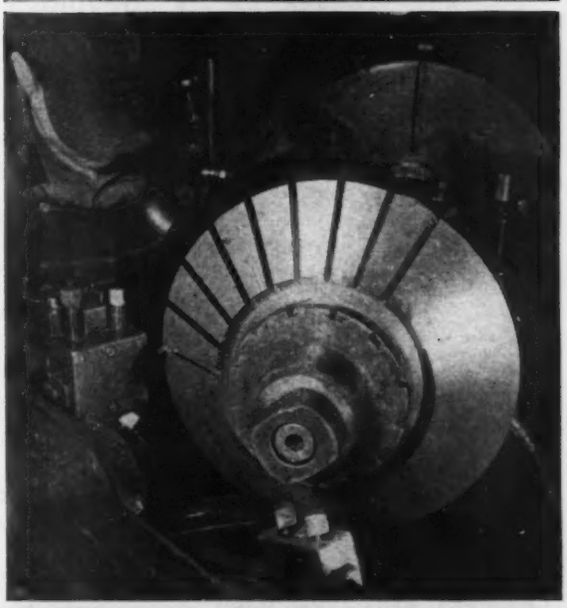
The Farval Spray Valve has been thoroughly tested in service and is now in use on a wide variety of machines and equipment. It has demonstrated its ability to supply lubricant efficiently and economically to open gearing, slide surfaces, in fact, wherever a standard Farval Dualine closed system is not readily adaptable.

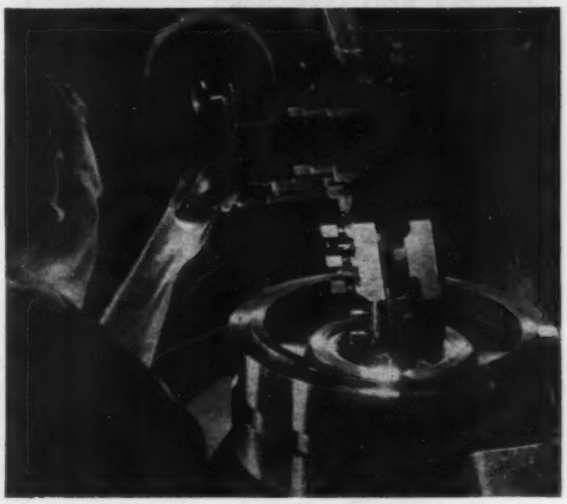
Write for a copy of Farval Spray Valve Bulletin No. 60 for a full description, with illustrative diagrams and installation data. The Farval Corporation, 3252 East 80th Street, Cleveland 4, Ohio.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.



WHY THE Strength GOES ALL THE WAY THROUGH





Bethlehem circular blanks are unusually strong, and the reasons include good steel, sound metallurgical practice, unique manufacturing methods.

The blanks are made in a three-way mill that combines the steps of upsetting, forging, and rolling. It is, so far as we know, the only machine of its kind in the country. Circular blanks produced in this mill have uniform density of metal . . . excellent grain structure . . . homogeneity. These qualities all contribute to through-and-through, rim-to-rim strength—strength that often makes possible thinner sections.

Bethlehem blanks are widely used in the making of gears, crane wheels, sheave wheels, brake drums, clutch drums, turbine rotors, tire molds, flywheels, and many other circular products. They are available heat-treated or untreated, in sizes from approximately 10 in. to 42 in. OD. Each order is beautifully rough-machined—a Bethlehem service welcomed by cost-conscious buyers and those with limited rough-machining equipment.

Like to know more? Like to see photographs of typical applications? If so, write for a free copy of Booklet 216.

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(Incorporated)
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THE IRON AGE

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October 19, 1950 • • • Vol. 166, No. 16

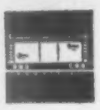
Special Article

Cold extrusion of artillery shells cuts steel requirements by 40 pct over previous forging methods. Mechanical properties and surface finish are excellent, weight and size tolerance high. Process is of vast importance to peacetime as well as wartime economy.—p.69.

Issue Highlights

Steels to be used at low temperatures should be thoroughly deoxidized and fine grained. Tempered martensitic steels behave better at low temperatures than pearlitic steels.—p.76.

Replacing a hand gas torch with induction heating in making name plates eliminated warpage, cut solder cost, increased production and cut overall cost by 52 pct.—p.81.



This week Pressed Steel Car Co. introduced a new Unicel freight car which could alter the classic concepts of carbuilding and rail shipping. Built of cellular laminates, each car saves 20 tons of steel.—p. 89.

The Joint Industry Machine Tool Preparedness Reserve Group believes curtailment of machine tool building may start in 90 to 120 days if the industry doesn't get more materials. The DO priority system was said to be useless to machine tool builders.—p. 91.

Shortages of steel, electrical equipment and power, plus a mounting scarcity of manpower are plaguing the electrochemical industry. Military drain on manpower, and retirements have left gaps which fewer new graduates can't fill.—p. 92.

The rural town of Seven Islands, Quebec, is astir with sounds and scenes of mammoth-scale construction to prepare nearby Quebec-Labrador iron ore mines for exploitation. The town will sprout miraculously—and its population may jump tenfold.—p. 93.

In a revision to its steel priority order NPA has ruled that steel companies, at least for the present, need not accept DO orders totaling more than 15 pct of their carbon steel production or 25 pct of alloy steel output.—p. 96.

Coming Next Week

Face-centered cubic metals retain toughness and ductility, even at very low temperatures. Poor low temperature performance of martensitic steels and most annealed steels is at least partly rheotropic.

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Indexed in the Industrial Arts Index and the Engineering Index. Published every Thursday by the *CHILTON CO. (INC.)*, Chestnut and 56th Sts., Philadelphia 39, Pa. Entered as second class matter Nov. 8, 1932, at the Post Office at Philadelphia under act of March 3, 1879. $8 yearly in United States, its territories and Canada; other Western Hemisphere Countries $15; other Foreign Countries $25 per year. Single Copies 35¢. Annual Review Number, $2.00.

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Wider Range of Work: The Model "L" Cecostamp can handle a wider range of work than previous models.

Easier Operation: Concentration of controls makes for ease of operation.

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Write for a copy of Bulletin 30-L-O

CHAMBERSBURG ENGINEERING COMPANY

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Editorial

INDUSTRY VIEWPOINTS

The Keystone of Defense

THE machine tool industry is the keystone of the whole defense program. We need these people. They need materials—and fast.

People who make up the machine tool industry are individualistic. They know their jobs. They know what to do and how to do it. They don't like politicians telling them off. Nor do they take kindly to advice from those who are ignorant of machine tool problems.

This is as it should be. But in the present crisis it is not enough. Machine tool builders should be among the first to get priority treatment—if defense is to be speeded. You would expect that the people in Washington would know this—and act on it.

Well, they don't and aren't. The industry has been ignored in the priority setup so far. People in this highly important industry are confused, mad and disgusted this week. Why? Because politics are all mixed up with defense. No provisions have been made to give machine tools preferential treatment. Unless clarification comes quickly tool builders may be at the end of the line for steel and other materials. This would sandbag the defense effort.

It looks like the Administration is more interested in politics and the November elections than it is in security for the country.

That is why L. D. McDonald, National Machine Tool Builders Assn. chairman on government relations and executive vice-president of the Warner & Swasey Co., let loose at the NMTBA meeting at Toronto last week.

Mr. McDonald laid it on the line. He hit out at "politics as usual" at the expense of quick preparedness. As he saw it there was ignorance, politics, confusion and inflation—all because first things were not done first.

The machine tool industry quickly needs steel, electrical controls, roller bearings and electric motors. Maybe this is too much to ask for so long as power to allocate is in politicians' hands. Time is running out. "Action is slow," Mr. McDonald said.

Let us hope speed, common sense and patriotism come to the front. Let us also hope that the political grip is loosened in favor of quick, simple and straightforward action. This won't happen unless we have more McDonalds.

Tom C. Campbell

Editor

HYDRAULIC PRESSES WITH THE HIGHEST SPEEDS* IN

*1,260 deep drawn stainless steel pieces per press per hour

300-TON SUPER-SPEED double action Lake Erie hydraulic presses. A battery of six of these units is shown in the plant of a leading automotive equipment manufacturer. Press has 150-ton main ram, 150-ton clamp slide and 75-ton die cushion. Bed area is 40″ x 40″, draw stroke 30″ and clamping stroke 18″. With 275 hp, press produces 2000″/min. approach and return, and 460″/min. pressing to capacity. Available in a wide-range of tonnages, bed sizes, daylight openings and strokes. Descriptive literature furnished on request.

NEWSFRONT

NEWS, METHODS AND PRODUCT FORECAST

► A molybdenum disulfide compound developed by a machinery manufacturer to solve a problem in extreme pressure bearing lubrication is finding wide acceptance in that and other fields, including drawing, forming, thread lubrication, etc.

Its performance at 100° below zero F has led to its use in aircraft; stability at temperatures to 750° F permits its application in ovens, conveyors running through furnaces, etc.

► While no details can be disclosed now, it is a fair bet that at least two new continuous casting processes will be disclosed before the end of the year.

► Despite materials shortages, auto makers believe their 1950 output may reach 8 million vehicles. Auto plants have already built more passenger cars than they did in any year except 1949. Truck output is now only 100,000 units below the 1949 output.

► Manufacturers of fuel tanks for home heating cannot meet demand now because of limited steel supply. The steel shortage is reviving the coal furnace business and one maker of gas and oil furnaces is planning to make coal furnaces again.

► The difficulty which a material has in qualifying for approval in the automobile industry is highlighted by the tests a windshield must pass. In all there are 24 tests covering abrasion resistance, chemical resistance, dimensional stability, flexibility, flamability, etc. Not the least is the impact test where a ½-lb steel ball is dropped on the glass from a height of 30 ft.

► Some government people are thinking about eliminating the spare tire on new cars as a means of saving rubber. Trouble is that during the last war most new car buyers ran out and bought a black market tire for the fifth wheel.

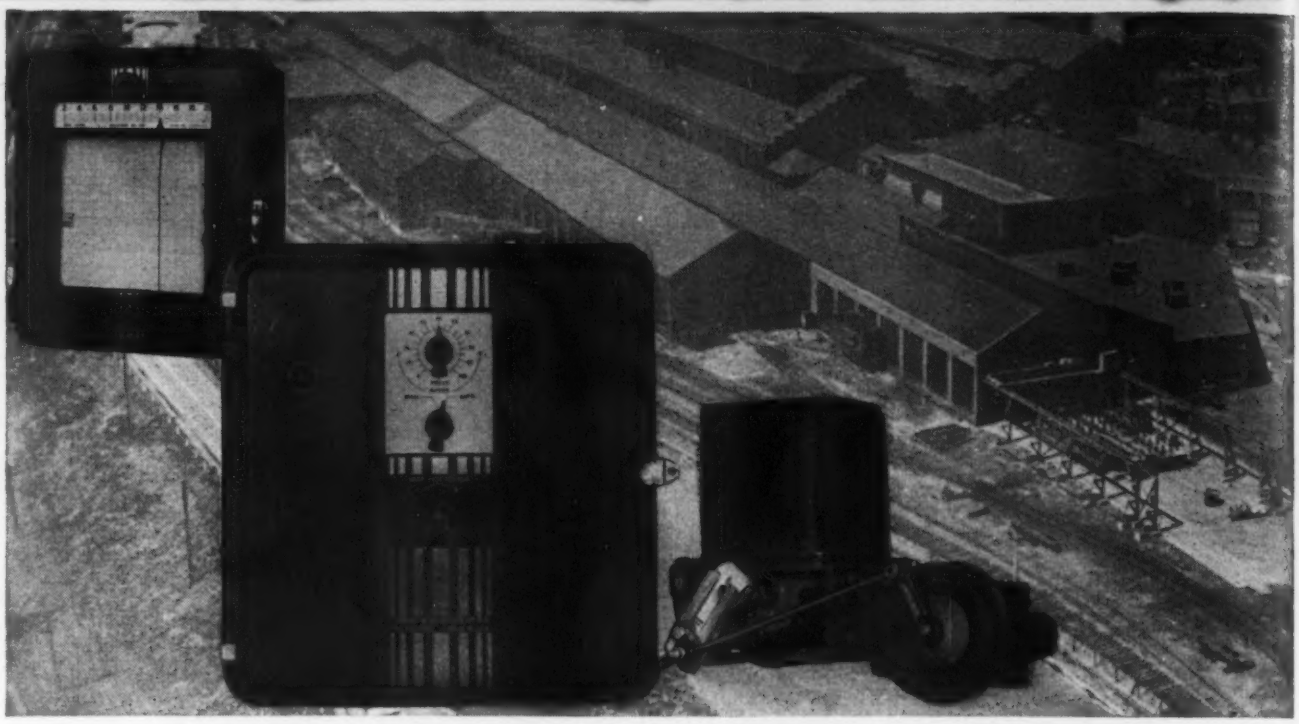
► Natural gas can now be cracked at any temperature, permitting production of large quantities of relatively cheap hydrogen and large amounts of colloidal carbons as byproducts. This opens up the long sought source of hydrogen for direct reduction of magnetite ore concentrates to produce a product competitive with scrap in open-hearth and electric furnaces.

► A big kitchen equipment manufacturer is negotiating for the purchase of a company caught selling excess steel in the gray market. Until the deal is closed, steel companies won't ship any steel to the plant.

► A special steel ingot hot top has been developed to stand up for 70 to 100 heats. The hot top is a cast steel flask lined with a special refractory brick. After each use it is of course reconditioned with a slurry.

► Some steel salesmen, lacking an inside track with the Kremlin, did a lot of overselling during the past year. This partly explains why quota cuts coming up for the fourth quota are so staggering. With DO orders coming in and mills driving to clean up by year end the cuts often run to 50 pct of quotas. Some consumers report that other mills have slashed an entire month's quotas.

► Security checks for military contractors should be less complicated now than they were in World War II because a 3-service Central Security Index file will list all security clearance investigations. A check list will show what subcontracts of a classified project may be handled as unclassified.



Major Advance in Electric Control Increases Production From Industrial Operations

With production demands reaching toward fresh all-time highs, this new P.A.T.'50 Control comes at the ideal time to help thousands of firms increase the output of their industrial furnaces. Here's why:

This Control has something that's brand new. It acts on the *speed* of swings in furnace load, as well as on their size and permanence. Thus, if temperature changes gently, it is gently nudged back into line. But if it starts off briskly—as when the furnace door is opened—P.A.T.'50 reacts briskly. The faster the change, the further P.A.T.'50 moves the fuel valve. Then, at the instant this action begins to head off the change, the Control starts backing away. By putting on the brakes it brings temperature back in line smoothly, rapidly.

This "Rate Action" increases production because it reduces the length of time a furnace is off temperature. It means more heats per week.

P.A.T.'50 is the Only electric positioning control with Rate Action. It's a unique L&N contribution to automatic regulation.

Also, Proportioning and Reset Actions are more responsive than before. These two components have always been vital to automatic control, and of course continue so. They stop the normal, every-day temperature swings which are started by changes in the size and permanence of the furnace load.

When we gave P.A.T. its third component of rate action—and introduced it in this '50 model—we were able also to increase the sensitivity and range of adjustment of proportioning and reset components. The resulting improvement in control action shows up at all times, but especially when temperature is being stubborn—trying to edge away from the control point, or to level off incorrectly. Even without rate action, P.A.T.'50 would do a better-than-ever job. But with rate action, results are far superior to any previous electric control.

The News is in the Control Unit. Everything new in P.A.T.'50 is in the Control Unit—the device in center of above illustration which is usually mounted below the Speedomax or Micromax Recording Controller, and which links that instrument to the fuel-valve-driving mechanism. In line with our policy of making improvements readily available to users of our equipment, earlier installations of P.A.T. Control can be converted to P.A.T.'50 by replacing the Unit and making slight changes in the Controller. The new Unit is fully electronic—has no moving parts except two hermetically-sealed relays.

For complete details, contact our nearest office, or write us at 4956 Stenton Ave., Philadelphia 44, Pa.

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LEEDS & NORTHRUP CO.

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DO Orders Limits Seen Doomed

Call Steel Trouble Shooters

Steelmaking Reaches New High

The Iron Age SUMMARY

IRON AND STEEL INDUSTRY TRENDS

THE National Production Authority's order limiting the DO (priority) tonnage that steel firms must book is already doomed. It cannot last more than a few months at most, and it might prove completely unworkable much sooner than that.

As a clarifying order it does remove some of the confusion resulting from the original order establishing DO priorities. But it in turn will have to be clarified and its limits on the percent of DO orders will have to be raised soon.

Anyone who really believes that DO orders will not require more than 5 pct of carbon and alloy sheet and strip production in the months ahead is due for a rude awakening. One steel company already has almost the entire production of hot-rolled sheets from one of its mills going into defense work. Another company has a single defense order on its books calling for more than 5 pct of one flat-rolled product. Programs already outlined will require much more than 5 pct of sheet and strip output. But sheet and strip are only one example. NPA will soon have to raise the limits on DO orders for other steel items such as plates and pipe.

Vital Programs Left Out

Moreover NPA orders so far do not provide steel tonnage for the long list of essential programs which do not qualify for DO ratings but which are vital to the defense effort. A few of these are freight cars, ship repairs, plant expansion, machine tools, farms implements, oil and gas pipelines, electrical equipment, roller bearings, motors and tin cans. This list could be extended almost indefinitely. To this must be added thousands of one-time orders which cannot be accurately anticipated.

This week NPA officials are wrestling with the problem of setting up ratings to obtain containers for petroleum, chemicals and other defense goods. Despite a shortage of containers, 5-gal and larger, there is no rating authority. Interior Dept. has authority over petroleum but it has no rating power that includes necessary containers. Defense Dept. can't issue such ratings because it doesn't buy containers as such. Responsibility lies with Commerce Dept. but miles of red tape would be involved.

Nucleus of Steel Men

It is becoming evident that even Washington recognizes that the basic priorities regulation is unworkable. Modifications already made and underway bear testimony to this. In addition, industry trouble shooters are rather belatedly being called. They will form the nucleus for more orderly administration of the coming modified controlled materials plan.

Two new appointments will soon be announced. C. B. Boyne, veteran of more than 25 years in the stainless steel field, will direct the stainless steel division of NPA. Allegheny Ludlum Steel Corp. has granted him leave of absence from his position as assistant general manager of sales and manager of stainless sales.

J. W. Robinson, manager of semi-finished sales for Jones & Laughlin Steel Corp., will become director of NPA, semi-finished division.

There is no doubt that many small companies have already been hard hit by the steel shortage. They have been forced to pay as much as $399.00 a ton in the gray market for cold-rolled sheets.

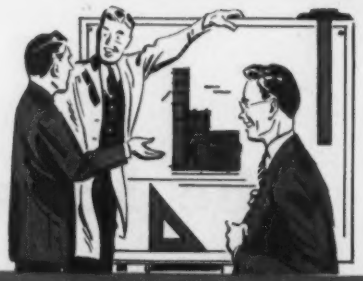
Steelmaking Record Smashed

A furnace manufacturer is holding up delivery on 80 pct of 400 to 500 furnaces because they lack steel to make casings for them. They are not going to pay high prices for steel to fill government orders for furnaces used in barracks. They are going to sit back and let the government get the steel for them on priority.

Steelmaking operations this week are scheduled at 102 pct of rated capacity, up one-half point from last week. This will be another new all-time high for steel melted in a single week.

(Nonferrous summary, p. 116)

Designed for



Continuous Operation

THE NEW HARRIS PRESS

BOTTOM DROP-OUT FOR BALES SPEEDS PRODUCTION—This revolutionary design is a great time saver and profit maker. While the compression chamber is baling, the charging chamber is receiving a new load. No bale is too large to come out of the new, speedy, bottom drop-out. This new Harris Press is of exceptionally sturdy construction from plates and structural shapes instead of the usual heavy castings. Both rivet and electric weld methods of construction are used. The Harris 4-A-BD Baling Press is designed and constructed to withstand far more strain than the safety valves of the power system will allow to be applied.

GENERAL SPECIFICATIONS

Size of charging box	84" x 76" x 57"
Size of finished bale	14" x 16" x 20"
Average weight of bale	300 lbs.
Average number bales per hour	38 to 43
Average tonnage per hour	6½ tons
Size of electric motor	75 H.P., 1200 R.P.M.
Vickers vane type rotary pump	2000 lbs. per sq. inch
Floor space required	21' x 23'
Shipping weight	84,800 lbs.

Ask us for full details on installation and operation of this sensational new Harris Press.

HARRIS FOUNDRY & MACHINE CO.

Reclamation Engineers Since 1889

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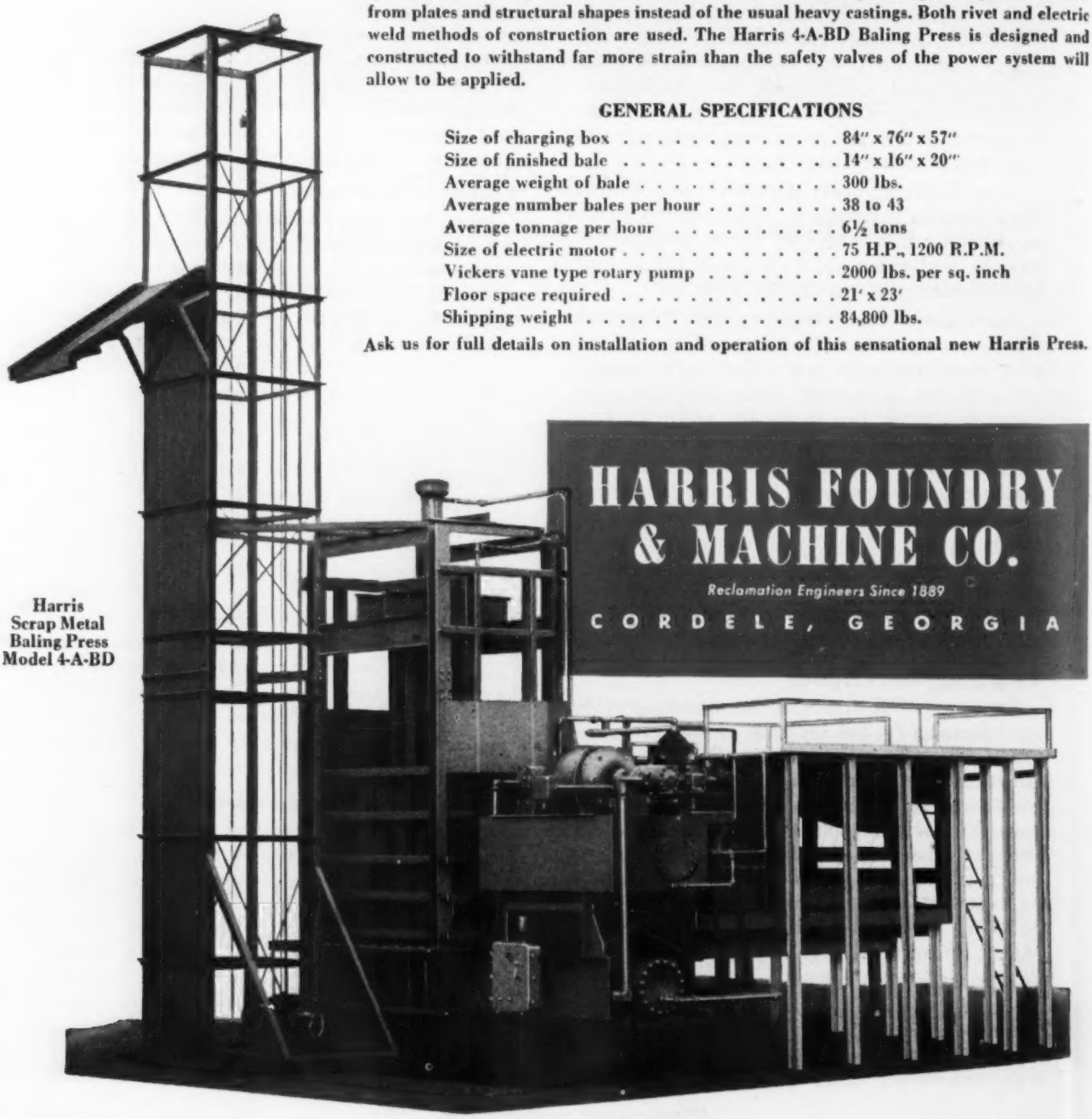

Harris Scrap Metal Baling Press Model 4-A-BD

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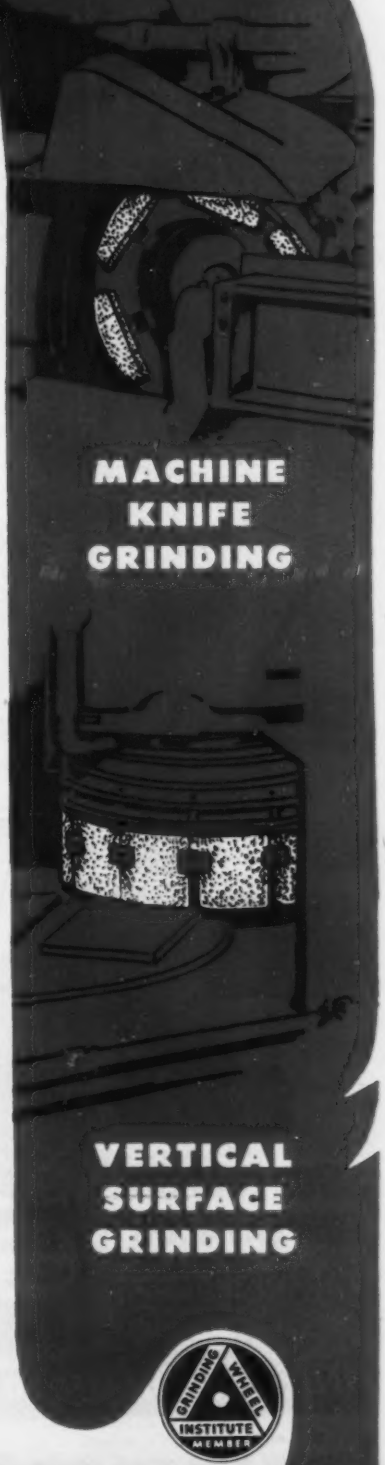
for speed and savings in grinding

Use Simonds Abrasive Company Segments . . . economical . . . fast . . . cool cutting . . . for surfacing large areas, a number of small pieces chucked together or machine knife grinding. In all sizes to fit all segmental chucks, solid or gap type.

Simonds Abrasive Company's complete line offers everything you need for vertical or horizontal surfacing . . . everything you need, including Straight Wheels, Cup Wheels, Disc Wheels, Cylinder or Ring Wheels, for all your grinding jobs. For information on abrasive segments, write for Bulletin ESA 188.



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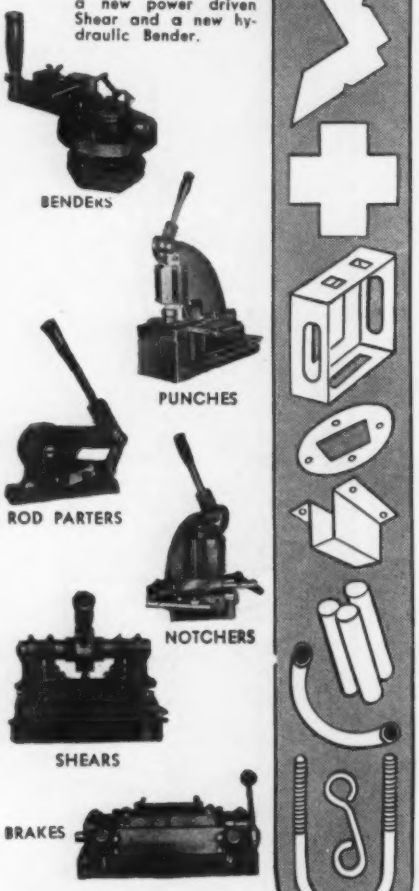

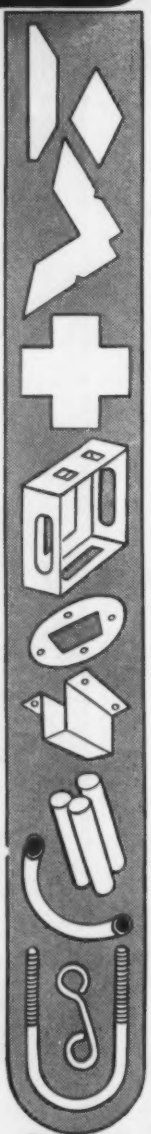

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Dear Editor

Letters from Readers

Another Scoop

Sir:

The article "Induction Hardening Arbor Used on Automatic Screw Machine," in the Aug. 24 issue deals with probably the most radical adaptation of the multiple spindle bar automatic that has ever been made on a single setup, and there have been many. Your editors have our hearty congratulations for their alertness in obtaining a documentary story which other metalworking publications have sought unsuccessfully.

J. E. LOUDON
Cone Automatic Machine Co., Inc.
Windsor, Vt.

Management's Representative

Sir:

Your editorial for Sept. 7 ["The Forgotten Man Is Remembered"] was most enjoyable reading. You certainly have hit the nail on the head. Our foremen in this country have been bypassed. They have been frowned upon by the superintendent and top officials as a necessary evil in many cases. Sure, sometimes they are told of company policies, after they are in effect and after the foreman learns of it from the worker.

Industry has in many ways neglected its responsibility in building good organizational structures. Many times the foremen have not been selected because they could lead men, but perhaps due to the fact that they were hourly workers who were constantly on the side of management. Making such men foremen at least reduced them to a point where they were ineffective in the battle raging between labor and management.

I definitely agree that companies must wake up and train our foremen. They, being the first wall of management, must be strong.

Business has been too busy looking after its profits to spend the proper time in training and placing before the public, the foreman and the worker what business problems are. We must get down to earth and talk—not in the terms of the lawyer and banker, but in everyday language, using examples that everyone can understand . . . not just propaganda . . . but rather, well-presented facts.

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Industrial Engineer
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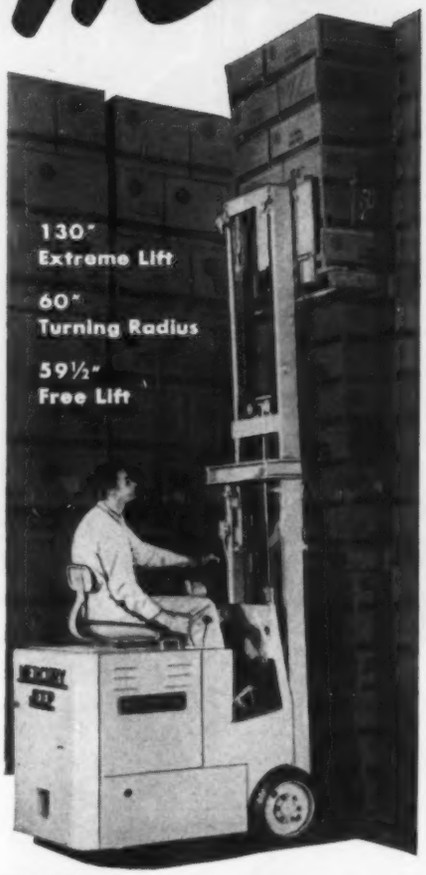

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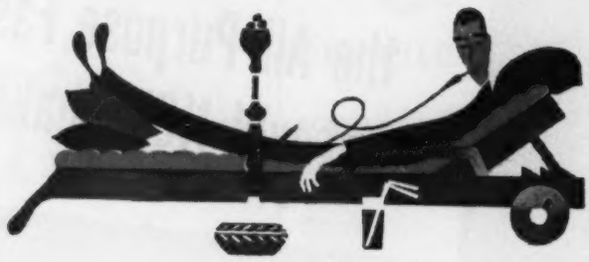

Fatigue Cracks

By CHARLES T. POST

Priorities

We see by your favorite family journal that "steel producers generally feel that the present system of DO priorities won't work." From experience in the last war, the experience is that priorities beget priorities until a slightly rancid odor rises over the whole system.

Next priority to be announced, according to best Washington authority, is to carry the designation "B.O." as a warning of things to come.

Prime Cold-Rolled

Clem Caditz, who is devoting his days to getting sheets for Northern Metal Products Co.'s hungry presses, says that all you have to do to become a successful steel broker is to memorize the line, "This is Prime Cold-Rolled Sheets."

"These brokers call up—you never actually see one of them and as for offices I think their phones are connected to other phones—and make you an offer.

" 'I got some material here,' they whisper insinuatingly; 'It's a little wavey and rusty, but it's prime cold-rolled sheets.'

"Or, 'For 14¢ a pound I can let you have a load of waste waster prime cold-rolled sheets.'

"I deal with a broker who used to ship me prime cold-rolled sheets with holes in them. That was the good material. Lately, instead of bundling his stuff, he's been shipping it in rusty old oil drums, but, of course, Charlie, he is only charging me 11¢ a pound.

"The last shipment, I figured I'd better take a look. I was suspicious. Maybe his quality was slipping. He only wanted 10¢ a pound. When I got to my receiving dock I knew my suspicions were justified. The drums were empty!

"I don't like to be rooked, Charlie. I got on the phone and started telling that broker off. I pointed out that even if he and I didn't see eye to eye on his prime cold-rolled sheets, the least I could expect was steel. He had to ship me *something!*

" 'Calm down, Clem,' he tells me. 'Nobody's cheating you. Did you unload the 42 barrels? Good—they are the prime cold-rolled sheets.'

"Tell me, Charlie, what do these steel brokers do in-between steel shortages?"

Puzzlers

If you take Associate Editor Bob Hatschek's word for it—and you can't doubt an editor's accuracy—the river's current in last week's problem was 3 mph.

Arthur A. Coffin, Jr., of A. G. Becker & Co., A. L. Graburn of the Pennsylvania R.R., and Oscar Quist of Chicago all agree that the diagonal board (Sept. 28) is 17.45 ft long, so it must be.

Now it's time again for the classic counterfeit bill story, brought to light by Harold Huston, Southwest Welding & Mfg. Co.:

A customer came into a shoe store in a small town, bought a $15 pair of shoes, and presented a crisp new $100 bill. To get change for it, the merchant had to go across the street to a grocer. With the smaller bills obtained at the grocery, the shoe store man gave the customer $85 change, wrapped the shoes, and thanked the buyer, who departed. Soon after, the grocer returned the $100 bill as counterfeit, and the shoe man was forced to reimburse him with good money out of the till. The shoe man, broken hearted, sat down to total up his losses on the transaction. What were they?

MACHINE TOOL High Spots

Sales Inquiries and Production

By W. A. LLOYD

Out of Balance—Steel supply and machine tool production were seriously out of balance in some segments of the machine tool industry this week as priorities or preferential treatment for the industry in the absence of certified defense orders faded into limbo.

Steel warehouses, regular source of supply for many machine tool companies, have had their quotas materially reduced, and are reducing customers' allotments accordingly.

Machine tool companies buying at mill level have historical quotas based on 1949, a period when their steel requirements were insignificant, and thus are in practically the same position as those who buy from warehouses.

Priorities Needed—What it will probably take to get the machine tool industry set up for coverage on steel requirements is placement of a large volume of orders certified by the Defense Dept. and the gradual assignment of priorities to machine tools.

In the meantime, it appears, as L. D. McDonald, chairman of the NMTBA government relations committee and a vice-president of Warner & Swasey Co., Cleveland, told members at their 49th annual meeting last week, in Toronto, that machine tool builders will have to scrap with all of the rest of the industries of the country for the unallocated 70 pct of steel production.

Highest Backlog—In Cleveland, contract tool and die shops have "a little less than 2 months' backlog as of Sept. 1," highest since May, 1947, George S. Eaton, executive secretary of National Tool & Die Manufacturers Assn., reported last week. Shipments or sales invoiced in August were the highest for any month since March, 1947.

He said civilian orders continue to account for the major portion of new order volume, which is at a high level, but a larger share of the industry's output is expected to be shifted to defense needs. Total value of production for 1950 is estimated at $325 million.

NMTBA is planning a mobilization survey of members. Object of the survey will be to determine the capacity and types of tooling made by the various contract tool and die shops.

Doubled Quota—In other sectors, indicative of the volume of business which some machine tool companies have received, one district office of a major eastern producer will double its quota this year. At present, sales are 60 pct above its annual quota with practically the entire fourth quarter to go.

Some trade sources are confident that the fourth quarter will maintain or surpass the prevailing high level of new business, despite extended deliveries. One of the reasons for this optimism is that many machine tool customers decide to clean up the last of their appropriation money in the fourth quarter, and sometimes put into this category funds not spent for other purposes.

Wage Increases—On the manpower front, shops are picking up new personnel gradually, but the need for training programs for draft exempt workers looms as imperative, despite the apparent victory in Korea.

Also, a number of the larger companies in the industry have reported wage increases during the past 3 weeks, indicating that the industry's wage structure where union shops are involved, may be due for a general increase A wage increase to the United Steel Workers of America (CIO) will probably mean a steel price increase, all of which does not weaken the position of proponents of escalator clauses in the machine tool industry. The cost situation seems to have the stability of quicksand.

Expansion—A three-fold expansion program has been announced by Cincinnati Milling Machine Co. Carlisle Chemical Works, Inc., a subsidiary, is moving into a new plant at Reading, Ohio, and will start operations soon. Plant area at the Cincinnati Milling Products Div., this city, is being enlarged. A new plant will be built soon at Wilmington, Ohio, to provide additional area for machine tool production.

Firm Sold—Acquisition of Master Builders Co., by American Marietta Co., was announced by Grover M. Hermann, president of American Marietta. Master Builders has plants in Cleveland, Buffalo, and Toronto, Ontario.

S. W. Flesheim, president, and Edwin L. McFalls, executive vice-president, of Master Builders, will continue with the company as a wholly-owned subsidiary of American Marietta Co.

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Metal Protectives Chart

Selection of the appropriate ACP metal protective and/or paint-bonding chemical is greatly facilitated by use of a new chart which lists: (1) The commonly used industrial metals; (2) typical surface treatments of these metals; and (3) the ACP protective coating chemical used for each typical operation. *American Chemical Paint Co.*

For free copy insert No. 1 on postcard.

Stud Welding Info

"Stud Welding in the Steel Industry" is the title of a new 8-p. booklet containing a step-by-step description of the use of end-welded studs in openhearth doors, and estimated cost savings and production increases possible when studded and rammed doors replace brick doors. Also included in the booklet are sketches and application data based upon the use of stud welding in such steel mill applications as skid tubes, craneway clips, oil burner tubes, and slab reheating furnaces. The Nelson topside method of installing roofing and siding materials is also described. *Nelson Stud Welding Div., Morton Gregory Corp.*

For free copy insert No. 2 on postcard.

New Lathe Catalog

Monarch Series 60 engine and toolmaker's lathes are concisely described and fully illustrated in a new 44-p. catalog. The booklet reviews major design engineering features and performance improvements of the new lathes, which are available in 12, 14, 16, and 20 in. sizes. Three different methods of cost-cutting, time-saving tracer duplication with which these lathes may be equipped are also discussed. In addition, 17 p. are devoted to lathe accessories and attachments, including the new automatic work driver, lever-operated collet attachment, and ball turning rest. Copies available on letterhead request only. Write to the *Monarch Machine Tool Co., Sidney, Ohio.*

Flexible Shafting

Features of Elliott flexible shafting that make for simplified power transmission at low cost are presented in a new 4-p. folder. A selection chart for power drive core is presented, along with information on the 36 standard types and sizes available. Cross-sectional drawings showing casing and core construction are included. *Elliott Mfg. Co.*

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Industrial Chemicals

A new 32-p. booklet describing Harshaw industrial chemicals has been compiled for a twofold purpose: (1) To furnish an alphabetical listing of the chemicals available from this company, and (2) to acquaint users with the wide scope of Harshaw's activity and with the diversity of their manufactured items. *Harshaw Chemical Co.*

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Improved Casting Quality

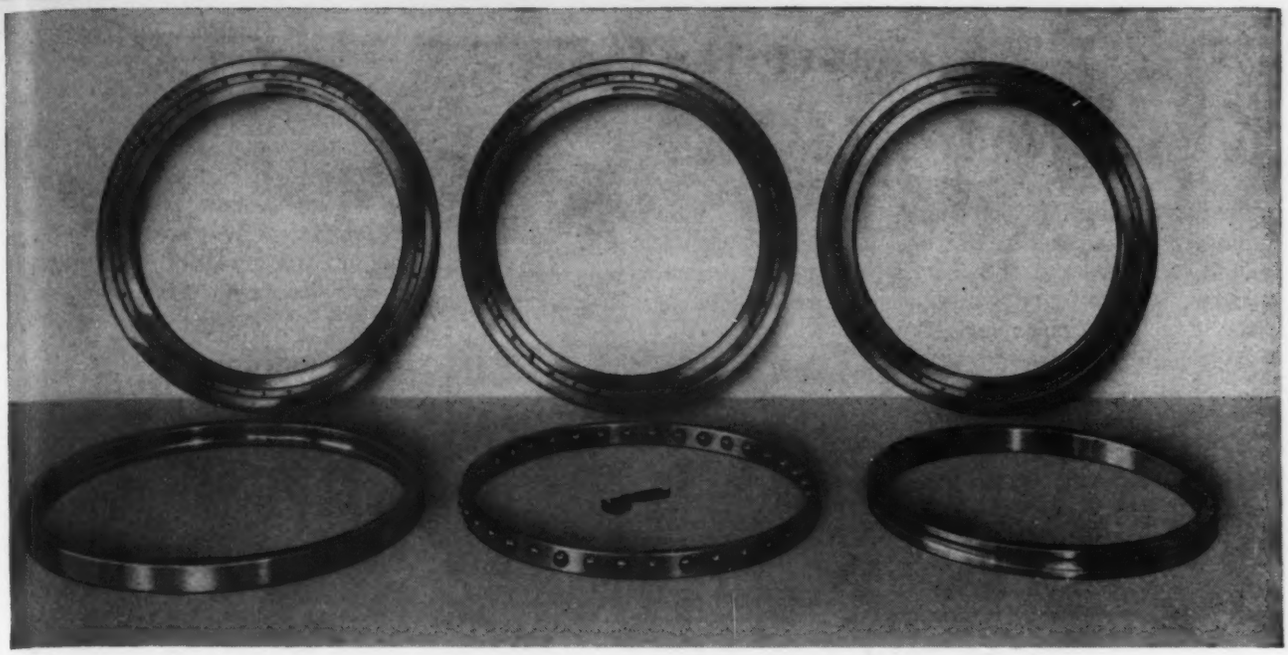
How cast iron quality can be improved through the addition of briquetted ferro-alloys of silicon, manganese, and chromium is discussed in a new 24-p. illustrated booklet. The booklet tells how briquetted ferro-alloys can be used to control iron composition and compensate for variations in raw materials. It also discusses methods for controlling amounts of carbon, sulphur, and phosphorus in iron. Tables of typical cupola charges show how to calculate the number of briquets required to produce either soft gray iron, medium soft iron, high-strength iron, or low-chromium iron. *Electro Metallurgical Div., Union Carbide & Carbon Corp.*

For free copy insert No. 5 on postcard.

Oil Story Told

"The Brooks Oil Story" is the title of a 20-p. booklet showing manufacturing techniques and production facilities of the 74-year old grease and oil compounding firm in the form of a picture tour. Included in the booklet are details on a variety of Brooks Leadolene Klingfast products, plus information on the planning procedure, research and development facilities and plant equipment. In addition,

Turn to Page 106



BIG KAYDON PRECISION BEARINGS PROVIDE PRECISION SUPPORTS FOR NEW "RIM-BALL" INDEX TABLES

A special KAYDON 4-point Ball Bearing, pre-loaded in assembly of the new line of Rehnberg-Jacobson "Rim-Ball" Index Tables, provides support underneath and just inside the outer edge all the way around. Designed to take heavy thrust and radial loads in any direction, this bearing completely prevents any tendency of the table to tip or distort, even slightly.

All six table sizes, ranging from 16″ to 42″, in the new line of R-J "RIM-BALL" Index Tables, are equipped with the type of KAYDON Special Ball Bearings shown above . . . a 35″ outside diameter bearing, for instance, is pre-loaded in assembly on the largest table.

This well-engineered ball bearing rim-support . . . plus locking accomplished by a cam-operated taper pin with a solid, quiet, smooth, accurate action . . . enable these tables to handle efficiently the heaviest cuts of milling or other chatter-producing operations in machining, as well as conventional drilling, reaming, tapping and similar precision work.

KAYDON bearing engineers, backed by sound experience and unusual facilities for designing and producing special bearings in sizes 4″ to 120″ outside diameter, will gladly work, in confidence, with your engineers, to improve performance in the machinery you produce. For dependable bearing counsel, contact KAYDON of Muskegon.

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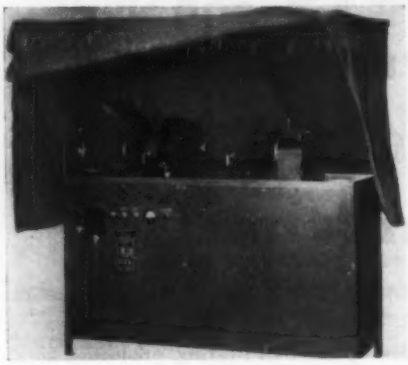
the paper strip as the coil diameter increases. Operating features include: accurate and stepless adjustment of the wire guide advance, even while machine is running; simple adjustment of wire pull, which will remain constant regardless of speed and reel diameter; and automatic cutoff. *Cosa Corp.*

For more data insert No. 18 on postcard, p. 37.

Magnaflux Unit

Inexpensive, effective equipment for automotive maintenance inspection.

The new type DR-543 Magnaflux unit furnishes the fullest sensitivity for inspection of automotive mechanical parts up to 54 in. long. Magnaglo, used in the unit with in-



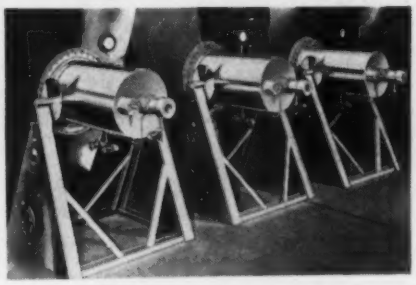
spection under black light in a folding hood, locates speedily and easily fatigue cracks and similar defects in parts during overhaul, by building up a glowing flouresecent line on each defect. The Magnaflux unit supplies high amperage, low voltage, ac magnetization, to magnetize any part longitudinally or circularly whenever desired. Visible or invisible defects can be marked. *Magnaflux Corp.*

For more data insert No. 19 on postcard, p. 37.

Sintering Furnace

Dual-tube electric furnace has maximum temperature range of 3300°F.

Work is simpler to load and unload and the heating element is easier to remove and replace as the result of design and construction improvements in the Pereco molybdenum-vacuum furnace. The furnace has a maximum temperature range of 3300°F with a neutral to reducing atmosphere said to be pure enough to sinter chromium



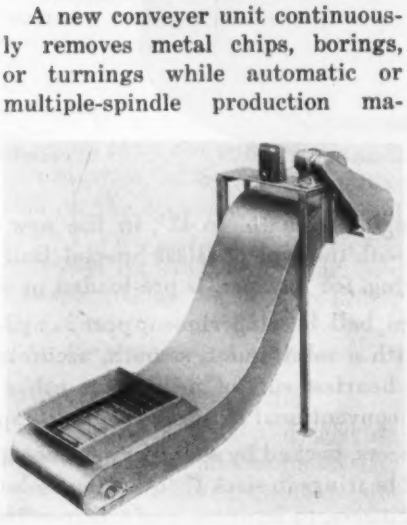
without oxidation. The steel case maintains a vacuum of 30 in. Hg indefinitely. A removable moly heating element compensates for heat gradient at both ends of the tube, that has a working area of 2 in. ID x 28 in. long, with 18 in. controlled temperature length. The cylindrical furnace may be rotated and locked for operation in horizontal or vertical position. Sight tubes are on one or both ends. *Pereny Equipment Co.*

For more data insert No. 20 on postcard, p. 37.

Metal Chip Conveyer

Removes metal chips or turnings while automatic machines operate.

A new conveyer unit continuously removes metal chips, borings, or turnings while automatic or multiple-spindle production ma-



chines are in full operation. Chip-Tote conveyers eliminate periodic shutdown of production equipment for manual scrap removal. They incorporate hinged steel conveyer belting to handle hot, heavy, and wet or dry chips and turnings. Chips are funneled into conveyer belt by means of a steel hopper, carried horizontally until clear of machine's operating mechanism, and then transported up incline of the conveyer for discharge into tote boxes or onto a carry-off conveyer system. Various models meet height and width requirements. *May-Fran Engineering, Inc.*

For more data insert No. 21 on postcard, p. 37.

Metallograph

Offers superior optical performance, simple and convenient operation.

This new instrument represents a progressive step in the field of metallography. All controls and adjustments are within easy reach. Directly in front of the operator are the 5x7 in. camera, the monocular or binocular microscope eyepieces, and the ball-bearing mechanical stage. The four objectives on rotating turret, the photographic eyepieces mounted on a quick-change slide, the camera

shutter and the color filters are operable from a sitting position. The optical systems for photography and visual observation are coupled to permit focusing through the visual system. Grain size measurements, ferrous or nonferrous, are compared directly on the ground glass with standard grain size charts. *American Optical Co.*

For more data insert No. 22 on postcard, p. 37.

Drum Sling

Aids in filling hoppers of molding and tabletting presses from drums.

A drum sling enables one operator with a chain hoist to easily and quickly replenish hoppers of molding and tabletting presses from 300-lb capacity drums. The drum is placed on the lower support member at floor level, the upper support member is firmly secured and the entire unit is raised by chain hoist

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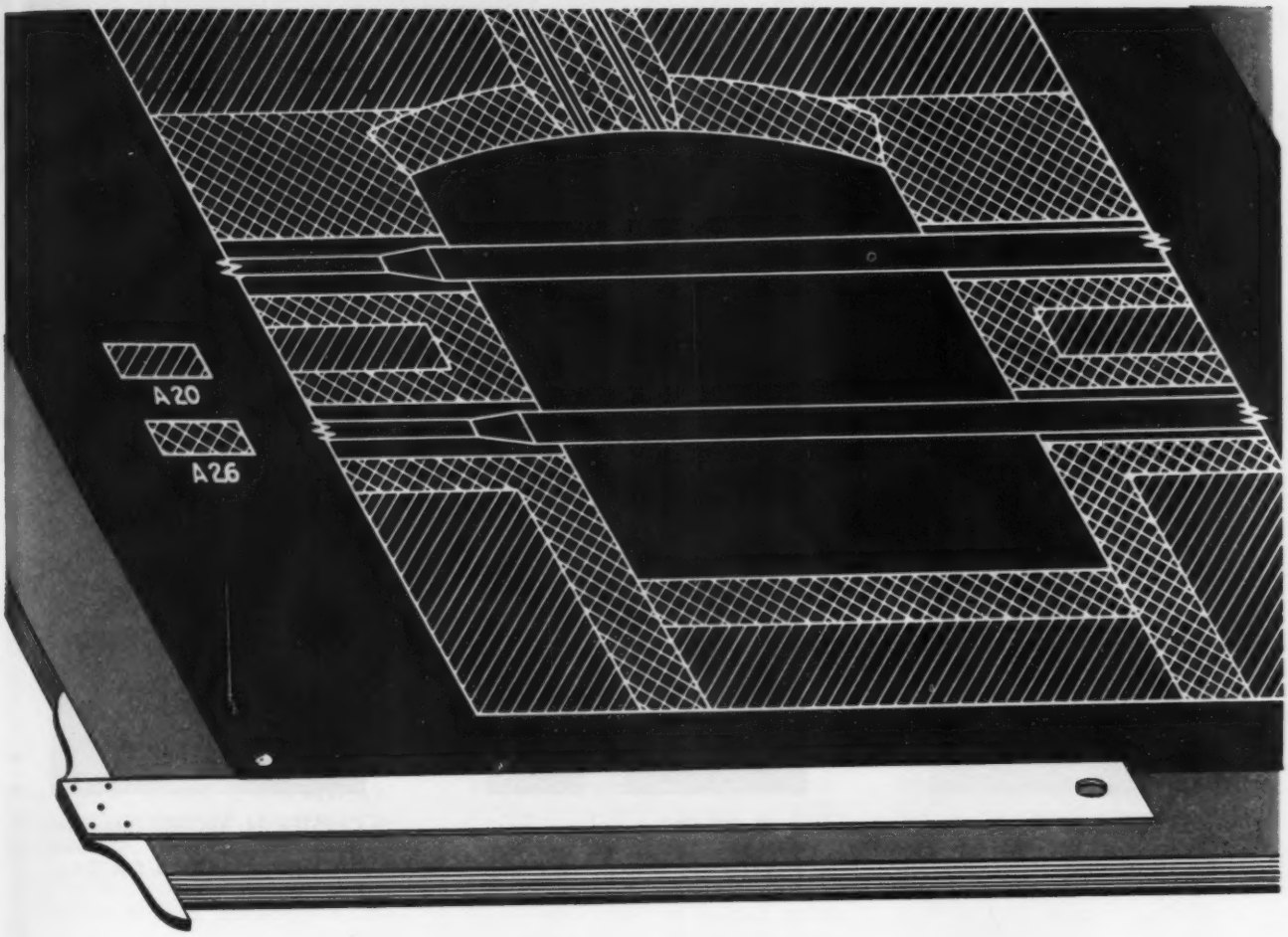


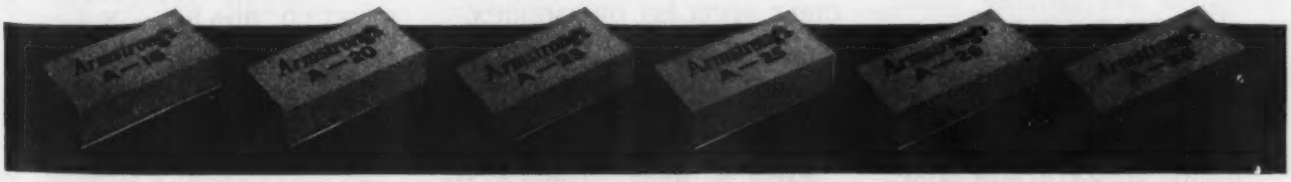
How to build a better furnace

By using the right insulating fire brick in the right place, you can make a furnace more efficient, longer lasting, and less expensive to operate. This 2250° F. gas-fired radiant tube furnace, operating under a reducing atmosphere, is an example of good brick selection.

Armstrong's A-26's, laid 4½" thick, completely line this furnace. They were chosen for their ability to stand up well under reducing atmospheres. Because of the thick furnace walls, this lining is subjected to a soaking heat. A-26 brick have the unusually high strength needed to resist compression under the hot load. Their top temperature limit of 2600° F. also provides a good margin of safety.

Five 2½" thick courses of Armstrong's A-20's back up the furnace lining. Their high insulating efficiency cuts fuel costs and promotes more even temperatures.

There are six types of Armstrong's Insulating Fire Brick for temperatures from 1600° F. to 2800° F. In its temperature range, each type is formulated to meet the insulating requirements expected of it. At the same time, every brick has high resistance to shrinkage and spalling and is light in weight yet extra strong. Of course, these physical characteristics vary somewhat from one brick type to another. That's why it's a good idea to call in an Armstrong engineer the next time you are faced with selecting the right brick, or combination of brick, for a specific furnace. His evaluation of brick properties in light of the conditions to which they will be subjected may lower your costs, improve your furnace operation, or do both. Call the Armstrong office nearest you or write to Armstrong Cork Company, 4910 Mulberry Street, Lancaster, Penna.



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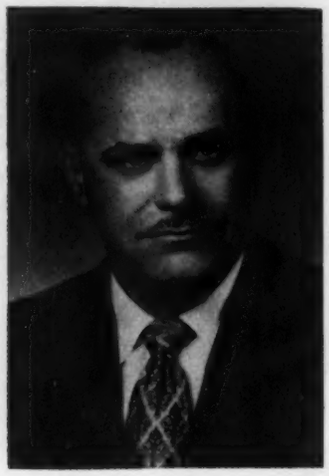
A. L. CARR, named vice-president and director of sales, Morse Twist Drill & Machine Co., New Bedford, Mass.

A. R. KELSO, elected vice-president, Mack Trucks, Inc., and vice-president and director, Mack Mfg. Corp., Allentown, Pa.



CHESTER M. BROWN, appointed vice-president, General Chemical Div., Allied Chemical & Dye Corp., New York.

Fred P. Biggs, appointed president of the Brake Shoe and Castings Div. of AMERICAN BRAKE SHOE CO., New York, and **Stephen S. Conway** made vice-president in charge of sales of the Brake Shoe and Castings and Southern Wheel Div.

Leonard C. Yancey, and **Frank Storms**, appointed vice-presidents of the IRON MINES CO., Venezuela. Mr. Yancey will manage the Venezuelan operations while Mr. Storms will be in charge of the Caracas office.

Scott B. Ritchie, named vice-president in charge of operations, U. S. PIPE & FOUNDRY CO., Burlington, N. J.

Robert B. Algie, appointed vice-president in charge of sales, FORBES STEEL CORP., Canonsburg, Pa.

Roscoe McCurdy, supervisor of appropriations and operating studies, Tennessee Coal, Iron & Railroad Co., has joined the comptrollers' department of the ORINOCO MINING CO., New York.

Walter S. Mardner, elected vice-president of the DAYSTROM CORP., Olean, N. Y., and **Glenn A. Babcock** appointed advertising and sales promotion manager.

William D. Truesdale, Jr., formerly manager of the claim division, made assistant manager of sales in the tinplate and export division; **William H. Eichengreen** made manager of the claim division to succeed Mr. Truesdale; and **William B. Gilmore** made manager of the commercial research division to succeed Mr. Eichengreen for the INLAND STEEL Co., Chicago.

H. H. Jason, appointed manager of tool sales and **J. D. Kennedy** manager wear parts sales, for the CARBOLOY CO., Detroit.

William E. Mulcahy, recently with Boston Electro Steel Co., has rejoined HUNT-SPILLER MFG. CORP., Boston, as assistant foundry superintendent.

M. G. Rice, appointed assistant superintendent of the LaBelle-Agricultural Dept., Midland Works of CRUCIBLE STEEL CO. OF AMERICA.

John C. Augsburger, senior assistant to vice-president, retired after 50 years with the AMERICAN BRIDGE CO., Pittsburgh.

Martin M. Miroff, returned to the ROYAL METAL MFG. CO., Chicago, as vice-president and general manager of its California plant.

William A. Jahn, made assistant to the president of INLAND STEEL PRODUCTS CO., Milwaukee.

Carl F. Herbold, named director of manufacturing planning for the Small Motor Div. of WESTINGHOUSE ELECTRIC CORP., Lima, Ohio. **K. H. Smith** will succeed Mr. Herbold as manager of industrial relations.

Douglas L. Darnell, named district manager in charge of the new Cleveland branch of the YALE & TOWNE MFG. CO.,

Robert F. Moody, appointed assistant sales manager in the eastern div., for the HYSTER CO., Peoria, Ill.

Arthur W. Eichmann, named to sales engineering staff, LEAR, INC., Grand Rapids.

Robert D. Hill, elected vice-president of the TAYLOR-WHARTON IRON & STEEL CO., High Bridge, N. J.

Jack Samson, appointed traveling freight & passenger agent at Portland, for the WABASH R. R. CO., St. Louis, to succeed **A. M. Cheatham** who resigned.

Carl W. Nedderman, elected assistant vice-president of EDWARD VALVES, INC., East Chicago, Ind.

Corbin H. Myers, appointed superintendent of industrial engineering for the NATIONAL SUPPLY CO., Torrance, Calif. and **David M. Sowle** made superintendent of industrial relations.

H. E. Hasemeyer, promoted to the post of assistant production manager for the ELECTRIC AUTO-LITE CO., Toledo. **Irwin B. Hayes,** former assistant manager will succeed Mr. Hasemeyer as plant manager.

Carl A. Georgi, chosen director of industrial relations of the TRANSDUCER CORP., subsidiary of American Machine & Foundry Corp., Boston.

J. C. Kuhn, retiring as vice-president and director of sales, MORSE TWIST DRILL & MACHINE CO., New Bedford, Mass. **C. F. Myers,** formerly midwest district manager appointed sales manager.

F. Harris Nichols, retired as vice-president, General Chemical Div., ALLIED CHEMICAL & DYE CORP. Mr. Nichols has been associated with the company for over 50 years.

Stanley M. Tracey, retired as executive vice-president of the DRIVER-HARRIS CO., Harrison, N. J.

Harold E. Read, elected to the board of directors of F. H. McGRAW & CO., New York.

Samuel J. Zeigler, appointed eastern engineering representative with headquarters in Washington, for the SOLAR AIRCRAFT CO., San Diego.

Philip L. Ward, named assistant chief engineer; **William C. Heath** heads the Aircraft Products Div. and **Paul A. Pitt** is chief engineer of the development section.

Alton C. Kendall, appointed plant manager, incandescent lamp plant, for SYLVANIA ELECTRIC PRODUCTS CO., St. Marys, Pa.

Edmund C. Schorr, named assistant manager of sales, specialty transformer and ballast div., Fort Wayne, Ind., for the GENERAL ELECTRIC CO. **Harry L. Erlicher,** former vice-president has retired after 50 years with the firm.

Robert Porter, appointed representative for southern Mississippi by ANEMOSTAT CORP.

R. A. Schaus, named metallurgical engineer, alloy, stainless and tubular products; **B. W. Buist,** named senior service metallurgist succeeding Mr. Schaus; and **D. C. Wilde,** named service metallurgist succeeding Mr. Buist, for COLUMBIA STEEL CO., San Francisco.

Iron Age Salutes

CENTRE W. HOLMBERG

AS president of the National Tool & Die Manufacturers Assn., Centre W. Holmberg is in the driver's seat of an industry preparing for quick tempo defense production. Right now he is neglecting his drawing board to work with NTDMA's Mobilization Planning Committee in preparing vital statistics on the industry's capacity and types of tooling made by various shops. To be discussed at the NTDMA convention in Cleveland, Oct. 30 to Nov. 1, the project should lay down a blueprint for defense planning.

The present trickle of ordnance designs approved for production in contract shops will become a flood. Mr. Holmberg, also head of August W. Holmberg & Co., Inc., New York, says, "Transition will be critical for many companies. It must be quick and right. Tooling is tailor-made and cannot be made before the part is designed in detail. That's why you can't stockpile special tooling."

Currently producing tools, dies and special equipment valued at an estimated $325 million annually, the nation's 25,000 contract shops will soon go to war and make the tooling for production of tanks, guns, fuses, radar instruments and countless other war goods. The shops are the final crucial link between design and production.

Mr. Holmberg believes that the industry is now better equipped than ever to meet the challenge of emergency. Postwar expansion in equipment and facilities has been huge and the industry has tripled its size since 1939. It has been recognized by government and business as essential.

A mechanical engineering graduate of Penn State, Mr. Holmberg joined August W. Holmberg & Co. and was made a combination business-technical man. He has shuttled between conferences and his drawing board ever since. This versatility has made him particularly valuable to the NTDMA. A man equally at home in the conference room and in the shop is rare.

He gets that light in his eye when he is faced with a perplexing die design problem. His verve when he talks of the 14-stage progressive drawing die he has just designed inspires his associates and is proof that individual ingenuity and skill play a large part in an economy of mass production and standardization.

D. W. HOLMES, elected vice-president in charge of sales, Parker Appliance Co., Cleveland.

FRANK E. WALLING, made general manager in charge of Canadian operations, Quebec Iron & Titanium Corp.

J. W. FAUVER, appointed vice-president, J. N. Fauver Co., Inc., Detroit.

Paul L. Eness, named to the staff of the Product Development Laboratory of the ACHESON COLLOIDS CORP., Port Huron, Mich.

Charles B. Lansing, Jr., named secretary of FERRY CAP & SET SCREW CO., succeeding **H. Allen Hall,** retiring. **William H. North,** elected assistant secretary.

George Gabriel, formerly plant engineer at the Mertztown plant of the ATLAS MINERAL PRODUCT CO., promoted to assistant plant manager and **Robert P. Desch** has joined the firm as a research chemist.

Irving R. Redland, named assistant to the chief engineer in charge of production and sales by FRAZIER & SON, Belleville, N. J.

Arthur H. Tracy, appointed credit manager of QUAM-NICHOLS CO., Chicago.

William J. Butler, named general counsel of PULLMAN, INC., Chicago. Mr. Butler, previously was general counsel of the Pullman Co., a subsidiary.

Donald E. Randall, named manager of the Sao Paulo, Brazil branch of the INDEPENDENT PNEUMATIC TOOL CO., Aurora, Ill.

C. J. Gerker, elected vice-president and general manager of the MIDWAY TOOL CO., INC., Melvin, Ohio.

R. P. Liggett, chairman of blast furnace committee for REPUBLIC STEEL CORP., Cleveland, has been given additional duties as general superintendent of blast furnaces, Cleveland district. **J. M. Komp,** named general superintendent of the coke plant; **G. N. Harmon,** made assistant general superintendent of the 98-in. strip mill to replace **W. E. Boger,** who resigned. **C. A. Tarter** will succeed Mr. Harmon as superintendent of the 98-in. cold strip mill and cold strip finishing department.

P. J. Gallagher, appointed general sales manager of Hinderliter Tool Co. Div., H. K. PORTER CO., INC., Pittsburgh.

Robert F. Golden, appointed works manager for the Reliance Div. of the EATON MFG. CO., Massillon, Ohio, and **C. A. Sellen** appointed assistant to the general manager.

L. W. Smead, promoted from assistant general sales manager to general sales manager, Ford Div., FORD MOTOR CO., Dearborn. Mr. Smead succeeds **Walker A. Williams** who was recently elected vice-president.

Chester R. Austin appointed manager of the development section of the Research Dept. of KOPPERS CO., INC., Pittsburgh.

Joseph G. Shryock, resigned as president of the BELMONT IRON WORKS, INC., Philadelphia. **John A. Mitchell** will succeed him. **A. W. Schede,** elected vice-president and **H. H. Stahl** elected vice-president in charge of sales.

Walter Donnelly, appointed works manager of the TOMKINS-JOHNSON CO., Jackson, Mich.

OBITUARIES

Charles A. Geatty, director of National Lead Co., New York, and former manager of its metal department, died Oct. 10.

Thomas Llewelyn, consultant and president of Llewelyn Associates, Inc., died Oct. 1.

William W. Criley, vice-president and general manager, Ajax Mfg. Co., Cleveland, died recently.

Ransford V. Mann, vice-president in charge of sales, Carpenter Steel Co., Reading, Pa., died Sept. 26.

Dudley S. Dean, director of Calumet & Hecla Consolidated Copper Co., Boston, passed away Sept. 26.

Arelin L. Wagoner, retired purchasing agent for the General Electric Co., Schenectady, died Sept. 28.

Francis E. Bash, assistant vice-president, Driver-Harris Co., Harrison, N. J., died recently.

Winslow Shelby Pierce, Jr., president, Split Ball Bearing Corp., Lebanon, N. H., and the Miniature Precision Bearing Corp., Keene, N. H. died Oct. 5.

Earle S. Henningsen, manager of engineering, Large Motor and Generator Div., General Electric Co., Schenectady, died Sept. 23.

Claude D. Eiler, president of Crescent Truck Co., Lebanon, Pa., passed away Sept. 28.

Charles E. Monahan, director of purchases for the Budd Co., Philadelphia, passed away recently.

Joseph A. Horne, chairman of the board of directors, Yale & Towne Mfg. Co., Stamford, Conn., died Oct. 3.

A. Oakleigh Bush, chief sales engineer of the Abrasive Div. of the Norton Co., Worcester, passed away recently.

SEVEN STRONG REASONS

Appreciation of its many advantages explains the trend to N-A-X HIGH-TENSILE steel by manufacturers of commercial vehicles.

- HIGH STRENGTH
- HIGH FATIGUE RESISTANCE
- GOOD FORMABILITY
- FINER GRAIN STRUCTURE
- GREAT IMPACT TOUGHNESS
- EXCELLENT WELDABILITY
- HIGH CORROSION RESISTANCE

MAKE A TON OF SHEET STEEL GO FARTHER

Specify—

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HIGH-TENSILE STEEL

GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division, Ecorse, Detroit 29, Michigan

NATIONAL STEEL CORPORATION

On the ASSEMBLY LINE

AUTOMOTIVE NEWS AND OPINIONS

Tightening steel supply hits auto production schedules . . . Fisher describes press setup in Pittsburgh plant . . . Buick and Plymouth in race . . . Hudson shows Hornet.

By WALTER G. PATTON

Nash Production Off—Nash-Kelvinator is the first automobile maker to cut its production schedules for lack of steel. A slash of 10 pct has been made in Nash assemblies at Kenosha and further cuts may be necessary, it has been indicated. Simultaneously, Nash made a cut of 20 pct in its refrigerator and range production. In addition to an acute shortage of flat-rolled steel, the growing tightness of stainless steel has effected the output of appliances at the Kelvinator Div.

Meanwhile, Kaiser-Frazer lost some production at Willow Run last week because of its failure to receive doors from the Budd Co. K-F and other car producers have indicated their suppliers are reporting steel banks are running much lower than normal.

In recent weeks, the number of automobile assemblies has dropped from an all-time high of 195,000 units to 170,000 units. Most observers now believe that automobile output will continue to slide, though there is yet no indication that DO orders are cutting directly into available supplies. The *threat* of DO orders, however, has overshadowed the steel delivery picture for the future. This threat is expected, sooner or later, to be reflected in reduced auto output.

Equipment Needs High—Equipment requirements for a modern auto body plant stagger the imagination. The new Fisher Body Pittsburgh plant, which will serve as a source of supply to 21 Fisher assembly plants, is an example.

Included in the manufacturing area at Pittsburgh is a battery of 169 presses. Nearly half of these presses range in capacity from 600,000 to 2,200,000 lb. In the metal shop, joining the press room, are 85 machines employed for welding parts into assemblies and sub-assemblies. In the tool room are 90 machines, including drill presses, lathes, boring mills, milling machines and planers. There are also 350 portable tools.

Approximately 900 dies and welding fixtures have been assigned by the various GM divisions to the Pittsburgh plant. During a typical week, 115 carloads of finished automobile parts are being shipped. Construction of the 800,000 sq ft building required 9,430 tons of structural steel. More than 3 miles of fluorescent lighting is needed to illuminate the plant.

Another major GM expansion is the 666,000 sq ft plant to be built by Buick north of the present Flint facilities. Construction has started and the building is scheduled for completion next summer.

Buick Plant Overcrowded—The Buick plant at Flint has been badly overcrowded during the past year. Aiming at third place in the industry, Buick expects to produce ½ million cars during 1950. This will be an increase of 150,000 units over the record-breaking 1949 total. During most of this year the Buick Dynaflow transmission department has been working three shifts. For many weeks the Buick foundry has been on a 7-day basis.

While Buick officials have declined to comment on the development of a new high compression engine, commitments for new tooling indicate a new V-8 high compression engine will be available, barring war developments, on 1952 models. Deliveries of equipment are expected to begin next spring.

New Engines Planned—It now seems probable that, following the

introduction of the new Studebaker high compression engine this month, the next engine announcement will come from Chrysler Div. of Chrysler Corp. According to trade talk, pilot operations may get under way at the Jefferson plant this month. Volume production by January is possible, informed sources believe.

These may be the only new high compression engines before 1952 models are introduced. If defense developments permit, within the next 15 months, DeSoto and Dodge, Buick, Ford 6 and 8, Lincoln and Mercury are expected to have new overhead valve engines ready for production.

Engine tooling activity at Dodge and DeSoto has slowed down in recent weeks, the trade reports. Much of the Dodge effort at the moment seems to be directed to tooling for a new transmission to be built at a plant outside Indianapolis. Announced this week by L. L. Colbert, vice-president and director of Chrysler and president of the Dodge Div., the plant will have 650,000 sq ft of manufacturing space. It is expected to be ready for manufacturing in the summer of 1951.

Hudson Hornet—Hudson has added a fourth line of cars for 1951. The latest entry is the Hornet, powered by the new H-145 engine which is the most powerful 6-cylinder job now in production. Compression ratio of the new engine which has an aluminum head as standard equipment is 7.2 to 1. Bore is 3 13/16 in. and the stroke 4½ in. Displacement is 308 cu in. Cooling water is directed around the valve seats, combustion chambers and the full length of the cylinder bores. Tappets are pressure lubricated and of mushroom-type design.

New Mercury—On October 23, Lincoln-Mercury Div. of Ford Motor Co. will introduce the 1951 Mercury with the industry's latest transmission — the Merc-O-Matic. (Introduction of the Ford-O-Matic is expected to come later.)

As previously described in IRON AGE, this unit combines a torque converter and a three-speed transmission. Since only limited production is now available from the Ford-Cincinnati plant, it is believed that most of the new units will come from Borg-Warner, which will build half of the Ford and Mercury transmission requirements.

Few Defense Orders—A check of machine tool suppliers here indicates that very few, if any, orders are coming through as yet with a DO rating. In the case of both the new Cadillac tank and Continental tank engine, the amount of new equipment purchased is said to be substantial, confirming earlier reports that mothballed, government - owned tools will be of only limited help in the present defense program.

The interesting contest between Buick and Plymouth for third place in the automobile industry deserves comment. At the moment, Buick holds an edge over Plymouth. The latest estimates by automotive industry gives Buick a production total of 424,799 through Oct. 7. This compares with an estimated Plymouth output of 416,783. For the week ended Oct. 7, Plymouth output was 18,214 compared with 8,917 Buick assemblies. However, Buick enthusiasts are willing to wager Buick will come out on top at the year's end, indicating maximum output at Flint for the entire year 1950.

Ford Open House—The experiment of conducting "Open House" at Ford seems to be working out very well. When the glass plant held its party 7780 visitors came to watch 2500 Ford workers on the job. Attendance at the plastic plant was 9500 visitors compared with 3000 employees. The ratio of 3 to 1 was maintained in the gear and axle plant when 9500 toured the plant where 3000 were employed.

Ford sees to it that the kids are well taken care of at these functions. Gallons of ice cream are passed out and small gifts for everybody make a visit to the Ford plant an occasion to remember.

THE BULL OF THE WOODS — By J. R. Williams

NOW LISTEN-- THIS AIN'T NO COLLECTION FER MONEY, IT'S A LIST WE'RE GETTIN' UP OF ALL WHO WANT TO GO TO A CIDER PARTY AT TH' THIRD ENGINEER'S FARM!
BERRY, I LOVE YOU! I'VE LOVED YOU AND ALL TH' BOYS FOR EIGHT HOURS A DAY FOR TWENTY LONG YEARS! DON'T TURN MY LOVE TO HATE--LET ME GO HOME AND LOVE MY WIFE AN' KIDS A LITTLE!
I'D HATE TO BE ON A OCEAN LINER WITH OL' GOOSE-BERRY--HE'D BE GETTIN' UP PARTIES TO ROW AROUND TH' LINER EVERY NIGHT IN THE LIFE BOATS!
THE ORGANIZER
10-20
J.R.WILLIAMS
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Heart of the new SLIPSYN is the amazing Type ASR synchronizing relay. Characterized by its extremely simple, sturdy and reliable design, this new relay is especially suited for heavy industrial service.

The ASR not only applies the field at the proper speed, but also at a favorable rotor position for best synchronizing performance. It is easily adjusted on the job for best operating conditions under actual load.

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SLIPSYN is the name applied to the complete line of Westinghouse Synchronous Motor Control. Standard types are available for operating and protecting all types of synchronous motor drives. Find out all the advantages of SLIPSYN controls now. Call your nearest Westinghouse office or write for Booklet B-4379. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

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WEST COAST PROGRESS REPORT

Digest of Far West Industrial Activity—By R. T. REINHARDT

Steel in the Vineyards—Ancient and deeply rooted vineyards and fruit orchards are yielding—sometimes reluctantly—to the industrialization pressure developing as the result of population growth in California's agriculturally rich San Joaquin Valley.

A tour made last week of scores of small, but flourishing metal-using plants in the Valley between Bakersfield on the south to Stockton on the north clearly revealed the metamorphosis taking place in the West's economy.

By far the majority of metal-working plants of all types owe their existence to the almost $1 billion dollar agricultural economy, but such plants as the California Wire Products Co., Inc., at Visalia, employing 14 workers and using 50 tons of wire a month; and Consolidated Western Steel Corp. at Fresno employing 150 and fabricating approximately 1000 tons of sheet and plate products per month—to take two extremes—are almost completely divorced from the agrarian economy.

Not Confined to Local Markets—Many of the three and four-man foundries and metal stamping plants depend on markets hundreds of miles from their plants for the bulk of their business. Several Valley foundries are shipping castings into San Francisco, Los Angeles and other Coast cities and profitably competing with larger and better equipped plants.

The explanation probably lies in high labor efficiency and extremely low overhead even though some foundries are paying as much as $54.00 per ton for premium grades of scrap while in the metropolitan areas No. 1 cupola cast is ranging around $48.00. Many of these small operations are owner - managed, with the owner working in the shop.

The agricultural income in the eight Valley Counties still far exceeds the $89 million wage and salary income from the 1075 manufacturing plants located there. It is this rich agricultural market which brought many of these plants into existence and which keeps most of the manufacturers busy and prosperous.

Small Scale Shops—For example there is Phillips Foundry Co. in Bakersfield employing 95 men manufacturing agricultural implements and steel castings, Strathmore Machine Works at Strathmore employing only eight men designing and making agricultural implements, and T. G. Schmeiser Co. at Fresno employing 30 men at peak periods making tillage tools. These concerns are typical of hundreds which have grown from one-man, farm-yard shops into prosperous manufacturers even though only on a small scale.

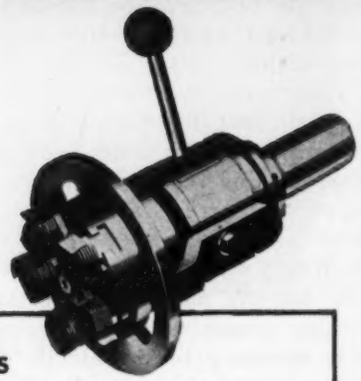
The population increase which is fostering industrial growth must be housed. Home construction in the valley as elsewhere in the West is at an all-time high and at least one company at Bakersfield is tackling the market on a near mass basis.

Shift in Power Demand Seen—Both power companies serving this valley—Pacific Gas & Electric Co. and Southern California Edison Co.—are confident that as a result of multimillion dollar expansions of both hydro - electric and steam generating plants, farmers in the valley will probably never again be faced with the necessity for curtailing pumping of irrigation water because of the lack of electricity during unusually dry years.

PG&E has just completed a 235,000 hp steam generating plant at Bakersfield and Southern California Edison Co. is rushing completion of its Big Creek hydro plant with approximately half that capacity.

Power Load Increases—Since California farmers as a whole use only a little less electricity than all of the farmers in the rest of the United States, the importance of the interdependence of power production and agriculture is obvious. In the valley a majority of the power load comes from farmers pumping irrigation water, and as wells must be driven deeper to meet a falling water table and additional acres are brought under cultivation, this power load steadily increases.

AND THEY GET 750 PIECES PER GRIND WITH A NAMCO RST TAP



If you want precision threading *fast*, yet economically —then you want the Namco RST Collapsible Tap. Check these features:

ACCURATE—a minimum of parts; fewer to adjust, fewer to wear. Rigid chaser support insures uniform, precision threads.

FAST—quick, positive collapsing at end of cut.

ECONOMICAL—NAMCO ground thread circular chasers are regrindable through a full 270°.

VERSATILE—any type RST tap may be used for either stationary or revolving spindle applications. (For revolving spindle, merely remove handle and replace with solid plate.)

SIMPLE—one screw and collar adjusts all chasers simultaneously to fine diametric setting.

JOB FACTS

Part—Adjusting Nut ½" x 4½" O. D.
Material—SAE 1115 Bar Stock.
Machine—Acme-Gridley 5½" RB-4 Spindle Bar Automatic.
Tap—Namco RST, with Ground Circular Chasers.
Thread—3½"—12NF Class 3.
Threading Speed—23 S.F.M.
Pieces Per Chaser Grind—750.
Machine Time—1 Minute 28 Seconds, Day In and Day Out.

Namco RST Collapsible Taps, equipped with blade chasers for thread sizes from 1¼" to 4" and with circular chasers from 3½" to 5", are described in Catalog D-49. Ask for your copy.

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Acme-Gridley Bar and Chucking Automatics: 1-4-6 and 8 Spindle • Hydraulic Thread Rolling Machines • Automatic Threading Dies and Taps • The Chronolog • Limit, Motor Starter and Control Station Switches • Solenoids Centrifuges • Contract Manufacturing

THE FEDERAL VIEW

THIS WEEK IN WASHINGTON

By EUGENE J. HARDY

Interior vs. Commerce—The Interior Dept. may have lost its battle with the Commerce Dept. to get control over the allocation and priority-granting powers on steel, but it is evident top Interior officials will continue to snipe at Commerce Secretary Sawyer. Recent example was a speech by Crow Girard Davidson, Assistant Interior Secretary, who maintained that the industry's expansion plans released by Commerce Secretary Sawyer (THE IRON AGE, Oct. 12, 1950, p. 149) were "just not enough." Mr. Sawyer said that the industry's plans were "an encouraging indication" and were "keeping pace" with the general growth of the economy. Mr. Davidson has long bowed low at the pro-expansion altar of Louis Bean, Agriculture Dept. economist, a permanent steel industry hair-shirt.

Interior officials fought long and hard for control over steel, but were dissuaded when the Commerce Dept. said it would take the matter to the President. Interior wound up with control over ferrous metals and minerals up to but not including the furnace and control over ferro-alloys and non-ferrous materials through the process of smelting and refining.

Requirements Secret—Munitions Board officials working on coordination of requirements of the military services for steel and other key commodities are fighting the "brass" to break down secrecy surrounding this data. Not only does the military attitude hamper NPA officials trying to work out allocations procedures, but the secrecy leads the public to believe that the impact on civilian production will come sooner and be greater than is actually the case.

Stockpiling Problem — Another problem facing the Munitions Board concerns their efforts to step up stockpiling at a time when military demands for key materials are increasing. Politics plays an important part here. Administration officials are fearful that taking large quantities of critical metals for the stockpile, an unproductive use, will create unemployment in certain areas of civilian production. Commerce Dept. says this is the worst possible time for a speed-up in stockpiling. While large demands for military production will cut into civilian output they will not have any inhibiting effect on employment, in fact, will serve to increase employment.

Nix on Committees—Further indication that the defense program will move slowly and have a limited impact on civilian output comes from the word passed to NPA division chiefs to cut down on appointment of industry advisory committees. From outset of the defense program, scores of industries have rushed representatives to Washington to work for appointment of an industry advisory committee. NPA, which had been going ahead with the establishment of such committees, will now o.k. them only when there is immediate need for action to meet defense needs.

Aluminum on the Griddle—Next month's congressional investigation of the aluminum industry will be confined to stockpiling questions.

Although there have been reports that Rep. Celler, D. N.Y., head of a House monopoly-probing subcommittee, wants to re-open the old question of "combination" in the industry, it is known that he plans to confine himself at the public hearings to questions concerning our lagging stockpiles of aluminum.

"Invitations" to testify at the hearings, to be held on Nov. 1 and 2, have been issued to representatives of Alcoa, Reynolds, Kaiser, and Alcan (Canada), and to spokesmen for government stockpiling agencies—Munitions Board, National Security Resources Board, General Services Administration, and possibly the State Dept.

Justice Dept. Background—Mr. Celler's chief investigator for the aluminum probe will be Curtis Shears, a government career lawyer with 21 years of service in the Justice Department's Antitrust Division.

The forthcoming hearings were prompted by Celler's interest in Alcan's proposal to be the exclusive supplier of aluminum to the Munitions Board for a 3-year period. Celler says he wants to know, among other things, if Alcan's past record of "preferring foreign sales to the needs of the U. S., justifies such a contract."

Progressive Steel Making for the Industrial Midwest

"Take a good look at the SYKES... she's really two ships in one!"

"I'm Clyde Johnson, Second Mate on the S. S. Wilfred Sykes, newest ship in the Inland Fleet. If you live near the Lakes, you may have seen her. In that case you'll know what I mean when I say the Sykes is two ships in one. She's big—678 feet long, with a capacity of 20,000 tons of ore. And she's fast—makes a round trip between Superior and Indiana Harbor in five days. That's why she can haul 880,000 tons of iron ore in one season . . . actually the work of two ordinary lake freighters."

The addition of the S. S. Wilfred Sykes to Inland's iron ore fleet is just one more step in a continuous modernization and expansion program. This constant improvement of every phase of steelmaking facilities is further evidence that Midwest steel users can put their confidence in Inland as a progressive and dependable source of steel in peace and war.

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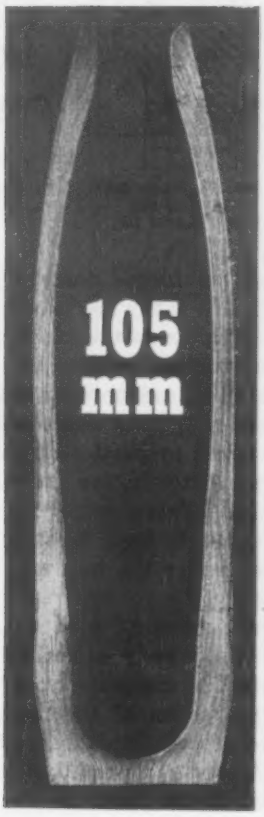
Products: Sheets, Strips, Tin Mill Products, Bars, Plates, Structural Shapes, Sheet Piling, Reinforcing Bars, Pig Iron, Rails and Track Accessories.

Cold Extrusion of Shells Saves Steel



By D. L. BROWN
Feature Editor, THE IRON AGE

Cold extrusion of shells at Mullins Mfg. Corp. cuts steel requirements by 40 pct over previous forging methods. Manganese content of the steel grade is also cut in half and no heat treatment is necessary. The mechanical properties are achieved through cold work. Better tolerances, both on weight and size are obtained and steel quality is less critical in cold extrusion than in hot forging.

COLD extrusion processes in recent years have proved the theory that under proper conditions steel is a decidedly plastic material which can be readily shaped at room temperature. Many of the fundamental concepts were first developed abroad. But the process itself has been brought to a high state of perfection in this country.

The major principles and the basic fundamentals of the process were published in complete form about a year ago (See THE IRON AGE, Aug. 4, 1949, p. 93). The process has wide application in the metalworking field because parts can be made with less metal, require little or no machining, and have an extremely smooth finish. So far most actual production has been on ordnance material, but the civilian use of cold extrusion for regular peacetime products will be large.

Mullins Mfg. Corp. was a large producer of shells during World War II. About 3 years ago this company began active investigation of cold extrusion. Recently Mullins has perfected the cold extrusion of 105 mm Ml artillery shells. Their process tooling and all details have been completed and if called on they can produce more shells of better quality at less cost and with less material than they could by hot forging.

Weight and size tolerances are of greatest importance on a shell. Consistent weight means a constant flight characteristic. The extremely close tolerance of internal cavity gives universal explosive charges in each and every shell.

In the old hot forging method, the weight of shell forgings averaged 42 lb on shells of 105 mm type. Through cold extrusion this same shell is now produced with 27 lb of metal. The govern-

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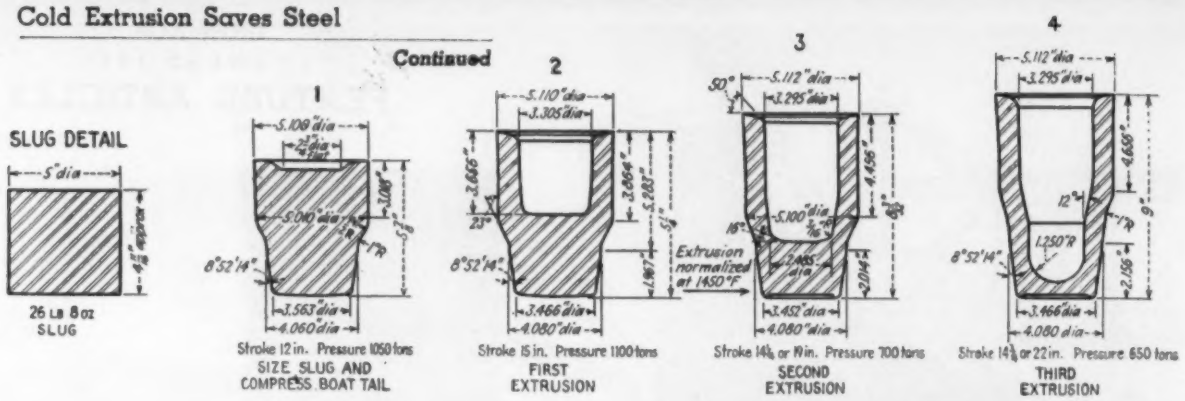


ment specification for hot forged finished shells is ±0.6 lb. Cold extruded shells are produced to ±0.1 lb tolerance. Wall thickness tolerance, which affects internal cavity volume, used to be in the order of 0.044 in. Mullins can now consistently produce shells wherein wall thicknesses are held to ±0.003 in. Mechanical properties of the finished shell are a large factor in the bursting or fragmentation patterns. These properties were formerly achieved through heat treating and varied somewhat even under the best controlled heat treating practice.

The mechanical properties of cold extruded shell are obtained in the process of forming the shell itself. As the shell is successively extruded to final shape, the properties of the metal are increased so that the process is dual in nature. Not only is heat treating obviated, but the mechanical properties of cold extruded shell are much more consistent than the heat-treated type. This means the bursting pattern of extruded shell is much more uniform.

All these facts are of extreme military importance but even of broader importance are the other advantages of the process listed in the box.

Mullins is using an AISI 1012 killed steel—0.10 to 0.15 C; 0.30 to 0.60 Mn; 0.040 max P; 0.050 max S supplied in the hot-rolled condition. During World War II and at present, the government specifications for hot forged 105 mm shell is a Si-killed steel-WDSS3-0.60 max C; 1.0 max Mn; 0.055 max P; 0.06 max S; 0.15 to 0.35 Si. It is estimated by Army Ordnance that if all 105 mm shell made during World War II had been cold extruded, 1 million net tons of steel would have been saved and roughly 250 net tons of contained manganese (not ferromanganese) would also have been saved.

Extrusion can be done using a slug of a number of different shapes. The slug could be a hexagon, a round, a round cornered square, etc., but Mullins starts with a 5 in. diam slug weighing 26 lb 8 oz. Actually each shell takes 27 lb of metal as 8 oz are lost in cold sawing the slug from the bar delivered by the mill.

Extrusion at Mullins is done on presses of 2000 and 3000-ton capacity although maximum pressures are not used. In Fig. 1 is shown a 3000-ton 60-in. stroke hydraulic press installed at the Mullins plant in Warren, Ohio. This press was installed by Ordnance and is now serving as a laboratory tool. Research in extrusion speeds, die design and size of presses is being done on this press and Ordnance expects to be able to develop much significant data on suitable press design for cold extrusion methods.

Contrary to some beliefs, cold extrusion can be done on standard hydraulic presses. In fact, Mullins research and production would indicate that fast hydraulic presses are a better choice if high production is to be attained than are mechanical presses. Mullins has cold extruded at a speed of 5 ips on the 3000-ton press.

Advantages of Extrusions

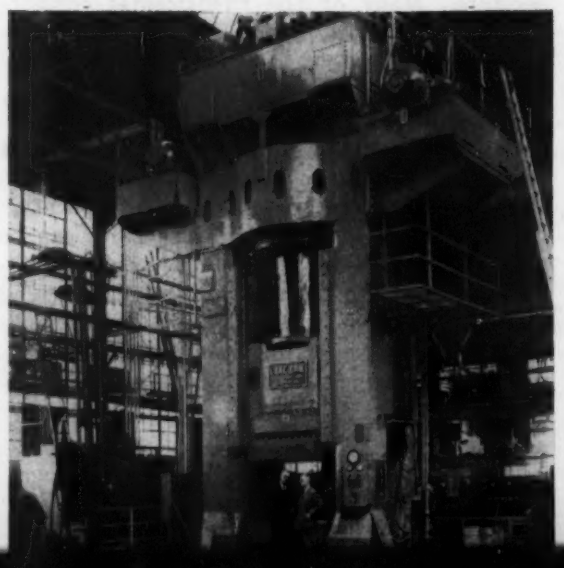
(1) Practically no machining is done on the cold extruded product. In fact, it would be difficult to consistently machine to the close tolerances produced by cold working.

(2) Because the final mechanical properties are achieved through cold working the metal, little or no alloy is needed.

(3) Much less metal per shell is required due to loss in machining, scaling in heat treatment, overfill in forging, etc. Practically every ounce of the 26 lb slug is used to make the 105 mm M1 shell ends up in the shell.

(4) The glassy smooth surface of the extruded product, 100 microinches or better, is a natural function of the process—not requiring any extra or subsequent operation of any kind.

FIG. 1—This 3000-ton hydraulic press was installed by Ordnance and is being used to develop fully cold extrusion techniques and press requirements.



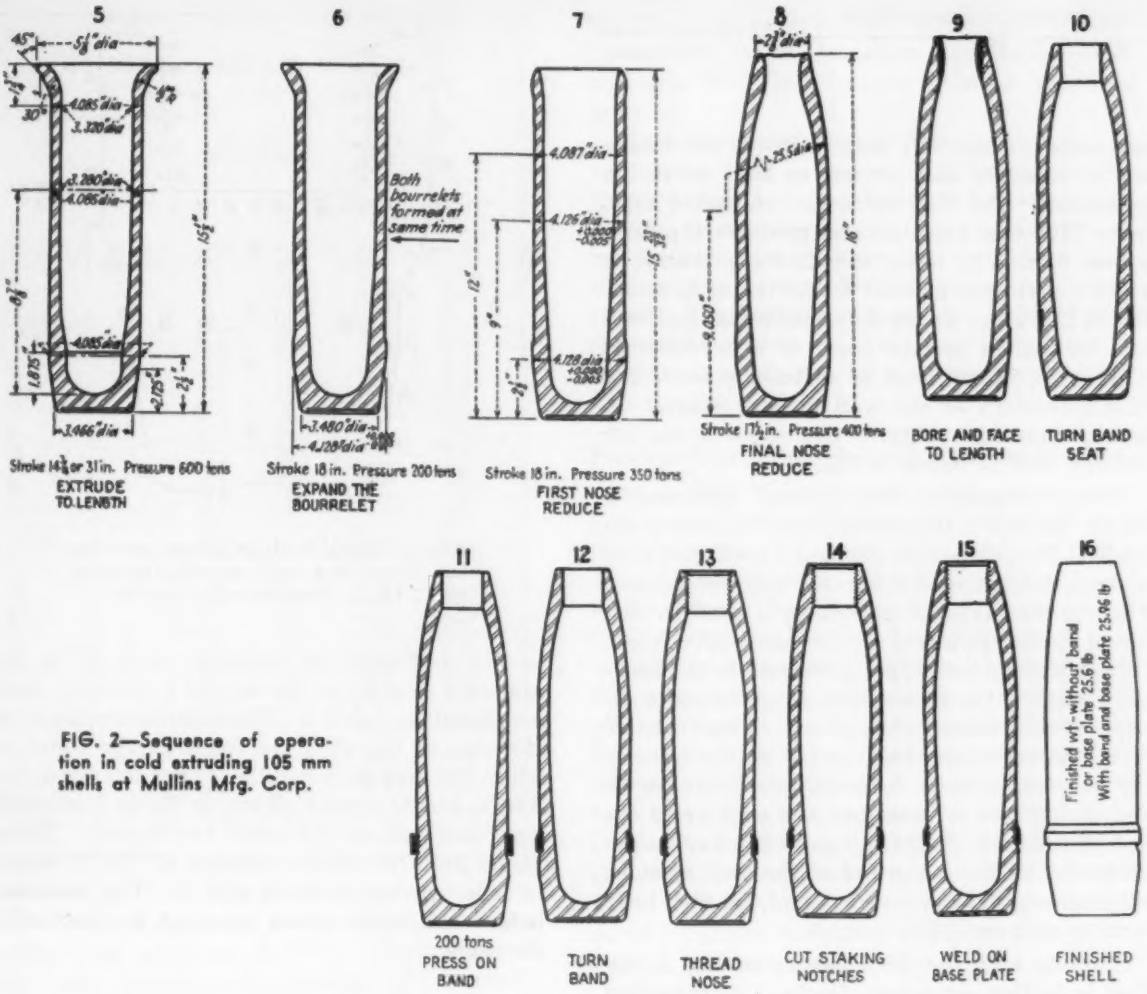


FIG. 2—Sequence of operation in cold extruding 105 mm shells at Mullins Mfg. Corp.

There appears to be no limit to the speed at which steel can be extruded within the impact properties of the metal. The only limiting factor in extrusion, once proper die and punch setups are achieved and metal flow is properly regulated, is the work hardening characteristics of the metal. It has been proved at Mullins that percent reduction or speed are only limited by equipment up to the point where the metal hardens to RB 100. At this point an anneal or normalize is necessary. From there on maximum reductions and speeds again are possible until the metal again reaches the maximum workable hardness of RB 100.

This hardness level or limit also holds for many different kinds and types of steel. The actual hardness produced in process, not the steel chemistry, is the all important factor.

Successful cold extrusion necessitates proper die design and maintenance of proper lubrication during all stages of the process. One of the interesting features of the work at Mullins is that this company has found that the ordinary Bonderizing treatment and run-of-mine, every-day deep drawing compounds are sufficient lubricants in their cold extrusion practice. No special phosphate coating or lubricant is used anywhere in their 4-stage extrusion process.

Reductions as high as 98 pct have been done at Mullins without use of special lubricants.

Close examination of the macros of grain flow in extruded cylinders indicates that the surface layer of the metal in a backward type of extrusion in properly designed dies does not slide past the side of the punch. The metal from the base of the slug is squeezed outward and upward in such a manner that metal is directed upward from the center and outside surface and is deposited along the inside of the punch. Once the surface layer is deposited, little or no deformation of that thin layer of metal occurs. The only metal that continuously slides past the punch is that at the base of the rounded or tangential corners of the punch. Regardless of what lubricant is used, no lubricating film is found on the side of the punch. It is obviously impossible to have a lubricating film at this spot when a slug is first punched. Later treatments may deposit a film on the ID of a partially extruded piece but this section of work does not need any lubricant when the die and punch is right as later illustrations will show.

The sequence of operation and forming of the 105 mm M1 shell at Mullins is shown in Fig. 2. A force of 1050 tons is used to size the slug and

compress the boat tail, step 1. Sizing the diameter is essential and critical to later extrusion operations. The first extrusion, backward type, takes 1100 tons pressure and produces the form shown in step 2. After step 2, the extrusion is given a normalize at 1450°F. Softening is essential at this stage as the deformed metal has been cold worked in certain areas to a hardness as high as RB 98 and must be softened prior to the long extrusions of the wall in later stages. A typical hardness pattern after step 2 on the 105 mm shell is shown in Fig. 3.

After normalizing the average hardness is RB 65. In step 3, the softened slug is further extruded. Mullins usually employs a backward type of extrusion, wherein the metal is never trapped. The forward type of extrusion is used in different applications and on 105 mm shell production at Mullins both types are used. In the backward method the metal flows in an opposite direction to the travel of the punch. In step 3, some of the metal which was located at the base of the previous slug is forced between the punch and die upward or backward and ends up in the wall of the shell. In steps 3 and 4 the mechanical properties of the lower end of the shell must be obtained and yet the remainder of the shell body must be soft enough to extrude.

Starting with the third extrusion, step 4, the shell is further elongated. During this operation the nose of the punch forms the bottom of the internal powder cavity. The contour of the outer wall is controlled by the die. In step 5, the forward extrusion is carried to completion, the shell has now reached its desired length and the wall thickness and outside contour at the boat tail are near final size. Successively less pressure is needed as the process shapes the slug from the first to final extrusion. Although the latter steps change the shape much more than the first operation, less metal is being displaced in the final extruding steps—hence less pressure is needed. The pressures used are shown in Fig. 2.

Expansion of both bourrelets is done in step 6. Sufficient metal is left in the inside of the cavity to form the bourrelet. In step 7, the forming of the bourrelet is done and the first nose reduction takes place. The final nosing in step 8 completes the contour of the shell. Step 7 could be eliminated but in mass production excessive die wear would result. The flange on the top of the shell, step 6, would not allow any lubricant to stay on the die in the nosing operation. The body shell at this stage has reached the final size both inside and out. The maximum mechanical properties have also been achieved through the cold work of extruding.

The location of hardness values along the wall of a typical finished shell made by Mullins appear

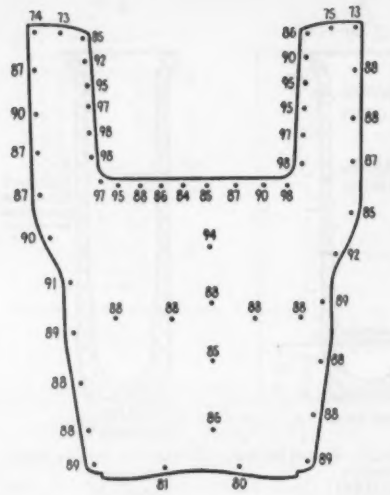


FIG. 3—Typical hardness pattern after slug has been sized and partially extruded, step 2 Fig. 2. Hardness values are RB.

in Fig. 4. Typical RB values taken at 0.5 in. increments midway in the wall of a sectioned shell are listed in Table I. The highest readings at the nose of the shell are found in the metal in which the largest reduction of area has occurred. The hardness spread shown in Table I between nose and tail of the shell are typical. These values are after stress relieving at 750°F, which is done between steps 10 and 11. The hardness before and after stress relieving is practically the same.

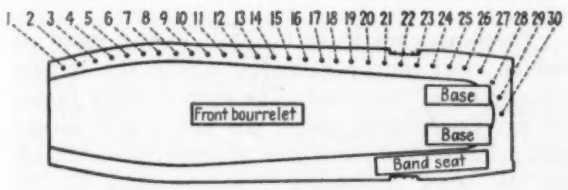


FIG. 4—Cross-sectional view of 105 mm shells showing positions of RB hardness tests shown in Table I, and test positions of tensile specimens.

The stress relief treatment increases yield strength markedly with less effect on tensile strength, Table II. The elongation is increased perceptibly but reduction of area is not appreciably changed by this treatment. It should be noted that the elongation is taken in a 1 in. gage length. The change in hardness values or the increase in strength during extrusion is not a straight line progression. In step 2 the first extrusion greatly increases hardness and strength. The normalize softens the steel and successive extrusions from then on increase the hardness and strength more gradually.

From step 9 on, the little machining that is done takes place. Relatively simple single purpose machines are all that are needed. Stress relieving up to about 650° to 900°F, depending

TABLE I

TYPICAL HARDNESS PATTERNS

Rb Readings at 0.5-in. Intervals

Position Number	Shell Location	No Stress Relief Anneal		Stress Relief Anneal	
		Shell #1	Shell #2	Shell #3	Shell #4
1	Front Bourrelet	93.5	95.0	97.0	95.5
2		94.0	96.0	95.0	97.0
3		94.0	95.0	96.0	97.0
4		94.0	94.5	97.0	97.0
5		94.5	94.5	96.0	97.0
6		94.5	94.0	96.0	97.0
7		94.5	94.0	95.5	97.0
8		94.5	94.5	95.5	96.0
9		95.0	95.5	96.0	97.0
10		96.0	96.0	97.0	97.0
11		95.5	95.0	96.5	97.0
12		95.0	95.0	96.0	97.0
13		94.5	94.0	95.5	96.5
14		94.0	94.5	95.0	96.0
15		94.0	93.5	95.0	95.0
16		94.0	94.0	95.0	95.5
17		95.0	96.0	96.0	96.0
18		95.0	93.5	96.0	97.5
Average		94.5	94.5	96.0	96.5
19	Band Seat	93.0	92.5	94.0	95.0
20		92.5	93.0	94.0	94.0
21		93.0	94.0	94.0	94.0
22		93.5	93.5	95.0	95.0
23		93.5	92.0	94.0	95.0
24		93.0	94.0	93.0	94.0
25		93.0	95.0	94.0	94.5
26		94.0	94.0	96.0	95.5
27		93.0	92.0	95.0	95.0
Average		93.0	93.0	94.0	94.5
28	Base	91.0	90.0	92.5	93.5
29		89.0	89.0	90.0	92.0
30		90.5	89.0	90.0	91.5
Average		90.0	89.0	91.0	92.0

on percent reduction and steel analysis, increases strength and decreases ductility. Beyond a certain peak temperature increase of strength through strain aging does not occur, and the metal softens, loses strength and increases in ductility. In Table III a shell not stress relieved is compared to two other pieces, one given a 650°F and the other a 750°F treatment. In order to meet the 15 pct elongation specification, Mullins uses the 750°F stress relief as standard practice.

TABLE II

TENSILE TESTS ON 105 MM SHELLS

	Specimen	Yield Strength, psi	Tensile Strength, psi	Pct Elong. in 1 Inch	Pct Reduction in Area
No Stress Relief Anneal	T-1	a. 77,300 b. 83,800	91,500	15.2	55.6
	T-2	a. 76,300 b. 82,300	90,300	14.1	55.0
Stress Relief Anneal	T-3	a. 86,300 b. 88,300	91,900	16.0	55.0
	T-4	a. 87,300 b. 88,800	92,700	16.0	52.8
No Stress Relief Anneal	1	a. 76,800 b. 82,000	89,100	*	57.6
	2	a. 76,300 b. 81,800	88,700	*	56.6
Stress Relief Anneal	3	a. 84,800 b. 86,300	89,700	16.2	57.6
	4	a. 86,300 b. 87,800	90,300	16.3	57.2

1. * Broke outside gauge marks.
2. T-1 to 4 taken from front bourrelet, 1 to 4 taken under band seat.
3. a. —0.1 pct offset.
   b. —0.2 pct offset.

Note: Results obtained on 0.252 in. diam specimens taken from four shells. Positions from which specimens were taken are shown in Fig. 4.

The finished shell, step 16, weighs 25 lb 9½ oz without the band or base plate. The original slug weighed 26 lb 8 oz, so that only 14½ oz of metal are lost in the process. In the old practices of hot forging or machining, between 10 to 20 lb of metal was lost per shell. By the cold extrusion process the Ordnance Dept. now believes that steel requirements for shells may be reduced by not less than 40 per cent. (Ordnance No. 181, July-August 1950, p. 31.)

Process Has Broad Metallurgical Implications

Aside from the economics of the process, savings in steel, less machining, etc., the metallurgical advantages of cold extrusion are of broad import. These properties are achieved without heat treatment and the need of alloy. Commercially this means that some steel chemistries now specified on a hardenability basis may be changed if the part lends itself to cold extrusion. The cold extrusion of shells is but a small part of a large overall program being carried out which will eventually utilize cold working instead of heat treating to obtain proper mechanical properties. So far this big program is sponsored by the Ordnance Dept., but these processes will find their way into peacetime production of many parts. Cylindrical parts, solid or hollow, are natural for this process.

TABLE III

EFFECT OF STRESS RELIEF TREATMENTS

	Yield Strength		Ultimate Strength	Elong. in 1 Inch	Reduction of Area	Rb
	0.1 Pct	0.2 Pct				
No stress relief	78,000	82,500	86,500	13	54.3	92
650°F stress relief	80,000	83,500	88,000	14	56.8	92
750°F stress relief	74,000	80,000	87,000	16	59	91

Test location in lower sidewall of 105 mm M I cold extruded shell.

The extent to which the strength of steels can be increased by cold extrusion is indicated in the previous story in THE IRON AGE. The limiting factor to the properties that can be extruded into a steel is not so much the ultimate strength as it is ductility and impact strengths. For ultimate strength levels over 110,000 psi, it would appear that the alloyed steels in quenched and tempered condition are still a better bet because at this strength a fair amount of ductility can be retained. However, for strength levels under 110,000 psi, the cold extruded parts can be made with as good or better mechanical property characteristics. The danger of cracking and distortion in heat treating is also obviated. By using alloyed steels and a combination of hot

Continued

forming and cold extrusion, higher strength levels are possible, but this field is still in the research stage.

In the extrusion of steel cartridge cases, it has been noticed that a greater elongation can be secured from a cold extruded piece than can be had with a straight cold drawn piece of the same metal. Work underway but as yet unpublished indicates further confirmation of this fact. Cold drawing should not be confused with cold extrusion as the forces applied to the metal and the manner of deformation of the metal are entirely different.

The surfaces of cold extruded parts are very smooth. At Mullins the standard surface finish is 100 microinches or better. The standard government specifications on conventionally forged and machined shells is 250 to 500 microinches. The degree of smoothness in a cold extruded part is a function of the smoothness of the die. Usually an extruded part will show an identical surface finish of the die through which the metal was extruded.

The maximum unit stress which can be applied in commercial extrusion practice is governed by the maximum stress the hardened tool steel punch can take. The stress on a die is not important as considerable mass can be used to offset high pressures. The size of the punch, however, is limited and the length of the punch is critical. It has been found that the tool steel punch used by Mullins, heat treated to Rc 54 to 55, will take a maximum of 275,000 psi stress before danger of failure occurs. Above this pressure too much heat is generated, the punch may soften, spall, scour, heat check or break. Mullins is using a steel made by Crucible Steel of the following analysis: 0.48 to 0.54 C; 0.40 to 0.60 Mn; 0.20 to 0.30 Si; 3.00 to 3.50 Ni; 1.00 to 1.25 Cr and 0.20 to 0.30 Mo.

No stripping device is needed in the Mullins punch and die extrusion sets as they are so designed that the punch makes a hole larger than itself. This permits retraction of the punch without any binding or seizing.

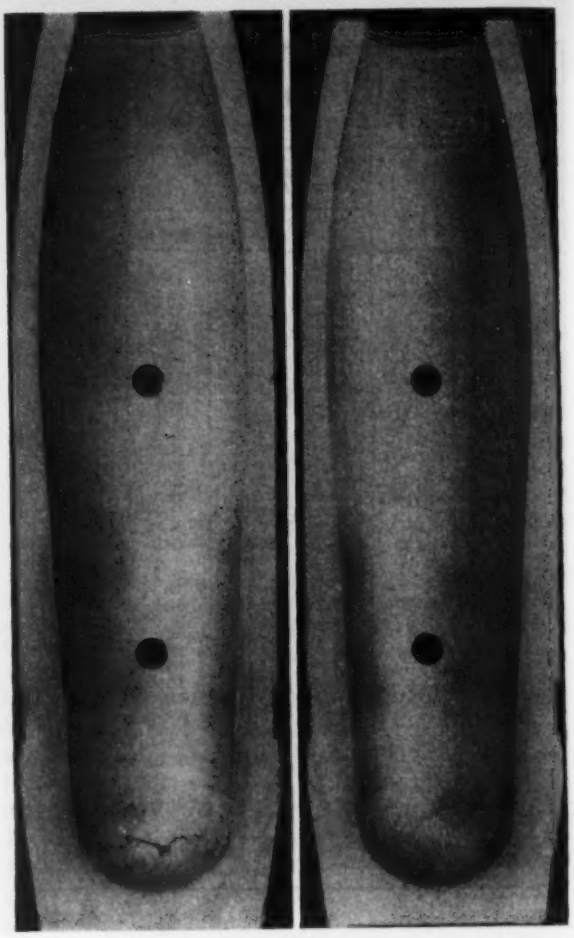


FIG. 5—Macroetched half sections showing interiors of 105 mm shells produced at Mullins Mfg. Co. in Warren, Ohio.

Macro etch cross-sections of an extruded 105 mm shell are illustrated in Fig. 5. A higher magnification of the etched cross-section shown in Fig. 6 is typical of the flow lines in these extrusions. Metal is so drastically deformed in cold extrusion that nonmetallic stringers or inclusions become less important in the quality of the finished shell. In steps 1 to 4 inclusive, the metal at the boat tail is compressed. The metal is held in compression in steps 2, 3 and 4 and only allowed to move backward and cannot move radially. The defects are broken up and scattered and unless the metal is excessively dirty,

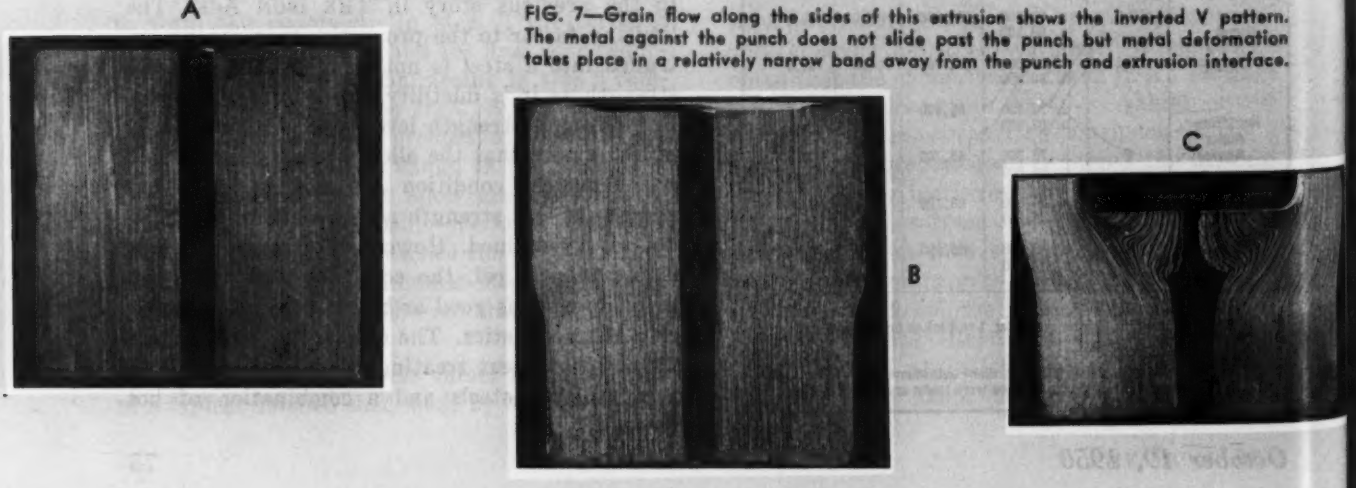


FIG. 7—Grain flow along the sides of this extrusion shows the inverted V pattern. The metal against the punch does not slide past the punch but metal deformation takes place in a relatively narrow band away from the punch and extrusion interface.

FIG. 6—A macroetched section of the base of the 105 mm shell showing typical flow lines.

the part will be satisfactory. Light seams in bar stock which cause many rejects in forgings, are not found detrimental to the manufacture of good extrusions.

The cold sober facts are that steel of lesser quality, compared to regular forging quality, makes perfectly good extrusions. One reason is that the forces applied in forging tend to open up and aggravate surface defects such as seams. In extrusion it is possible to expand the OD in such a way that these defects are pushed out and ironed out to the point that they are harmless.

Tests on capped and killed steel show that such steels can be used for extrusion. The Ordnance materials, however, because of their nature, will probably continue to be made of special bar quality killed steels. The chief reason is that the carbon range can be much more easily controlled and fewer surface defects will occur. Shell quality as such, however, has not been found necessary in the making of 105 mm shells at Mullins.

Some believe that the drastic metal savings from bar to shell in cold extrusion are misleading because the actual yield of the ingot is less than if the part were hot forged, machined and heat treated. Mullins has proved that ingot yields can be better when making extruded shells than when hot forging methods are used.

To determine how much improvement of a gross defect could be effected through cold extrusion, holes were drilled through the center of slugs prior to extrusion. Holes $\frac{1}{8}$ in. in diam drilled clear through the slug could not be found after the slug was extruded into a shell. In Fig. 7 a $\frac{3}{8}$ in. diam hole was drilled and the successive steps show how the process naturally tends to eliminate center defects. In this case the hole was too large to eliminate and Fig. 7 is used merely to illustrate what happens to center defects in bars which are extruded.

Also of interest is the grain flow clearly shown in Fig. 8. The flow pattern, particularly on the ID along the side of the punch, is conclusive proof that little or no friction occurs between metal and punch except at the corner of the punch.

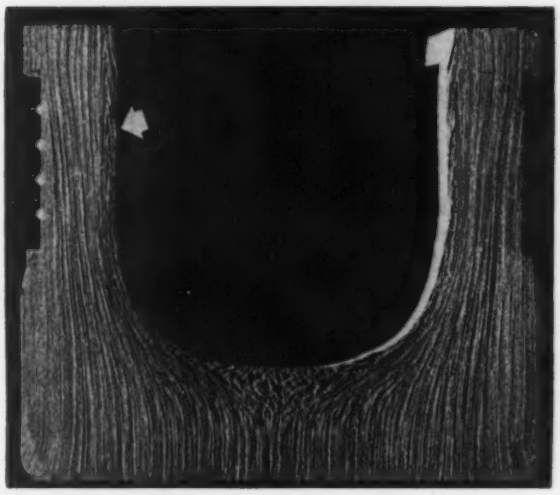
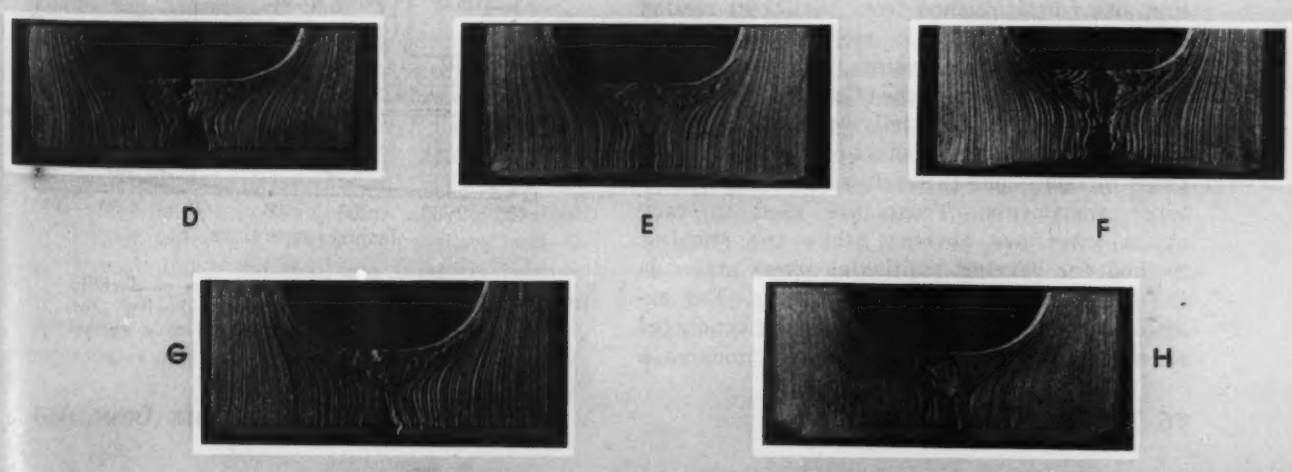


FIG. 8—Sequence of forming an extrusion from a slug in which a $\frac{3}{8}$ in. hole was drilled. This picture illustrates how the process tends to eliminate center defects.

These facts do not mean that inferior ingots or types of steels are, or ever will be, used in extruded ordnance products. However, it is clearly evident that less specially made or treated steel is necessary to make a perfectly sound high quality product than has been used heretofore. This means that higher steel tonnages are now possible in some cases. Where the mills had to expend considerable time and take special precautions in the past, they may now ship a product requiring less care in production. However, only when extrusion is applied to peacetime products will the full impact of this fact become evident.



Subzero Properties of

Steels to be used at low temperatures should be thoroughly deoxidized and fine grained. Distribution of carbides should be spheroidal rather than lamellar. Tempered martensitic steels behave more favorably at subzero temperatures than do pearlitic steels.

WHEN any metal or alloy is used at subatmospheric temperatures, its hardness, yield strength, ultimate strength, fatigue strength and modulus of elasticity increase as the temperature is decreased. The ductility and toughness may increase, not change, or decrease, depending on the metal being considered and the testing temperature interval.

The outstanding example of a metal which is ductile and tough at room temperature and which becomes brittle at low temperatures is steel. As the testing temperature is decreased, the high room-temperature ductility of steel and the other metals which are low-temperature brittle does not decrease in a smooth, continuous fashion. Instead, the major ductility and toughness changes are generally limited to a narrow temperature range, as shown in Fig. 1. The temperature at which these materials change suddenly from ductile to brittle is known as the transition temperature.

The actual value of the transition temperature depends greatly on the testing conditions. If a transition temperature is obtained on a particular material, increasing the severity of any of the other embrittling agents during the test moves the transition temperature to higher values. Considerable data are available on the effect on the transition temperature of the embrittling agents, strain rate and multiaxial stress state.

The other common embrittling agent, test section size (distinguished from heat treat section size) is also thought to move the transition temperature to higher values. However, a systematic investigation of the effect of this variable has never been satisfactorily conducted.

Investigations on the effect of the first two of these variables lend themselves readily to laboratory experiments. Techniques used to vary strain rates are obvious, while the simplest method for varying multiaxial stress states is the use of different-shaped specimens. For example, a regular unnotched tensile test conducted on a material which does not neck produces a mild stress state; a test of this type subjects the specimen to tensile stresses only in the direction of the applied tension, producing a uniaxial stress state.

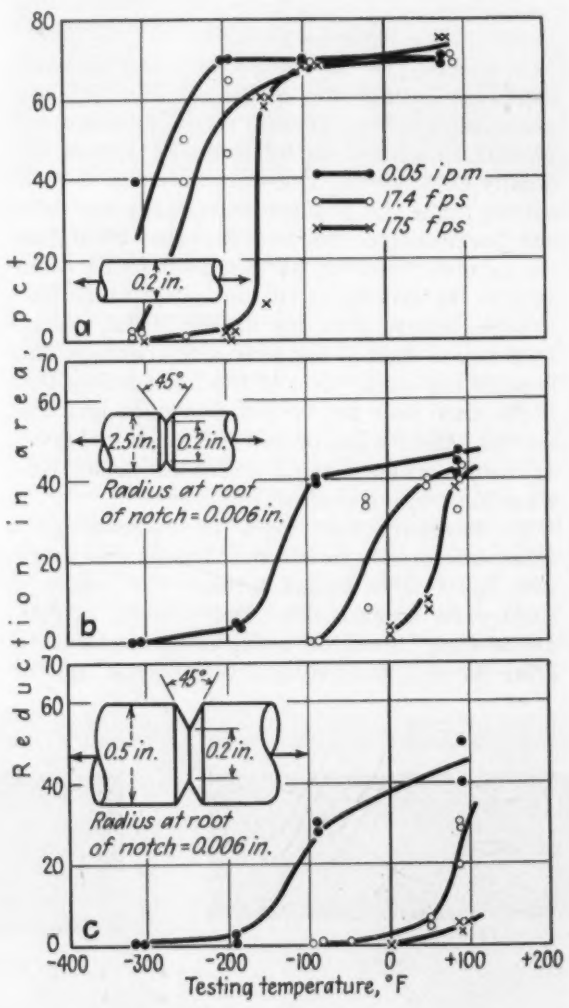


FIG. 1—Effect of testing temperature on ductility under various testing conditions, showing that major ductility changes are limited to a narrow range. Jones and Worley[1].

Metals Surveyed

PART I

By E. J. RIPLING
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A more severe stress condition, the biaxial stress state, which subjects the specimen to tensile stresses in two perpendicular directions, is developed by the use of wide, thin bend specimens. The most severe stress condition, however, is obtained by the introduction of tensile stresses in all three principal directions; this is called a triaxial stress state. This condition is obtained by the use of notched bars. When notched bars are strained, the degree of the triaxial stress state (or the embrittling effect) can be increased over a wide range by using a smaller radius at the bottom of the notch, a smaller included angle, or a greater notch depth.

Jones and Worley[1] recently presented some data obtained on a number of steels and on one aluminum alloy for which transition temperatures were obtained by conducting tensile tests at various strain rates and with variously-contoured notched tensile specimens. The data they presented on a rimmed 0.17 pct C steel are shown in Fig. 1. The transition temperature was raised as the speed of loading was increased for any particular specimen shape, while with a constant deformation rate the transition temperature was raised as the severity of the notch increased. These authors chose to vary the notch severity (or the magnitude of the transverse stresses) by changing the notch depth. Similar curves would presumably have been obtained if they had varied either the notch radius or the included angle instead.

The importance of transition temperature determination is shown in the data in Fig. 1. With an unnotched test, Fig 1a, and a slow strain rate, the ductility obtained at —200°F is about the same as that obtained at +75°F. An application of this steel, even under this mild straining condition, would be more dangerous at —200°F than at +75°F, since the former temperature is close to that at which the steel can suddenly become brittle. Knowing the transition temperature then makes it possible to determine how far into the safe range any ductile behavior may be.

Data presented in Fig. 1 can be replotted so that the testing temperature and either the strain rate or the degree of notch severity is kept constant, while the embrittling agent not held constant acts as the independent variable. The shape of the curves obtained on a plot of this type would again suggest the existance of a phenomenon similar to that of a transition temperature. Here, however, the proximity of any application to the fast change from a ductile to a brittle condition is measured in terms of notch severity or strain rate instead of testing temperature.

If a steel, under some particular application, is near its transition value, as measured in terms of any of the three embrittling agents, the steel is dangerously close to being embrittled by only a slight variation of any of the other embrittling agents. Since testing temperatures are readily controlled in the laboratory, a steel's reaction to an increase in severity of this variable makes it possible to predict performance when the severity of any other embrittling agent is increased.

It is generally impossible to relate the three embrittling agents quantitatively. It can only be stated that increasing the severity of any one of the embrittling agents causes the steel to react in the same way.

Low Transition Temperatures Help

The lower the transition temperature obtained on a particular metal, then, the better that metal is able to resist any combination of the embrittling agents. To insure the occurrence of the transition temperature at a value that is readily obtained in the laboratory for most structural steels, a mild notch and a moderately fast loading rate are satisfactory. For this reason, the Charpy impact test has been used so widely in evaluating transition temperatures. Many specimen shapes other than that used in the Charpy test, and loading rates quite different from that of the dropping pendulum, can be successfully used in obtaining transition temperatures. Transition temperatures, however, can be compared only when

they are obtained under the same straining conditions.

The most satisfactory method for defining the transition temperature quantitatively is still the subject of some discussion. The transition temperature is frequently given as the temperature range over which the ductility or toughness changes from a high value to a low one, as seen in Fig. 1. However, some particular point on this curve might be selected as the transition temperature. Some of the points considered are the lowest temperature on the ductile branch of the curves in Fig. 1 (the knee), the highest temperature on the brittle branch of the curve (the heel), or the point of inflection between these two points. For convenience, an approximation to this last criterion is frequently made by determining the temperature within the transition range where the toughness is equal to one-half the ductile value.

Transition temperatures are also frequently given in terms of fracture appearance. When the ductility or toughness of the test specimen changes from a high to a low value, the fracture also changes from a shear (fibrous) to a cleavage type of fracture. Consequently, transition temperatures can be reported by selecting some arbitrary percentage of cleavage fracture. Such temperatures are frequently given as the temperature at which 90 or 100 pct of the fracture is fibrous.

An engineering index for transition temperature values recently suggested by Baeyertz, Craig and Sheehan[2] was the temperature at which the toughness is 80 pct of the ductile value. This value has particular merit for heat treated steels, they point out, since the ductile branch of the curve for heat treated steels is generally horizontal. This makes it easy to select the 80 pct value. They report that this value corresponds to the lowest temperature at which 100 pct fibrous fracture is obtained with heat treated steels.

The relationship between low temperature strength properties and notch severity can be seen in data recently presented by Tuer, Ripling and Sachs.[3] These investigators determined the strength properties of a 2.75 pct Si steel as a function of testing temperature with a number of different-shaped notch bars, as shown in Fig. 2. The fracture stress-testing temperature curves obtained all appear to be sections of a complex curve containing a minimum and a maximum at some low temperatures. The positions of these minimum and maximum fracture stress values move to continuously higher temperatures as the notch severity is increased. Sufficient data are available in this test series to determine the equivalence between notch shape and testing temperature for this steel.

The fracture stress is defined as the breaking load divided by the minimum cross-sectional areea after fracture.

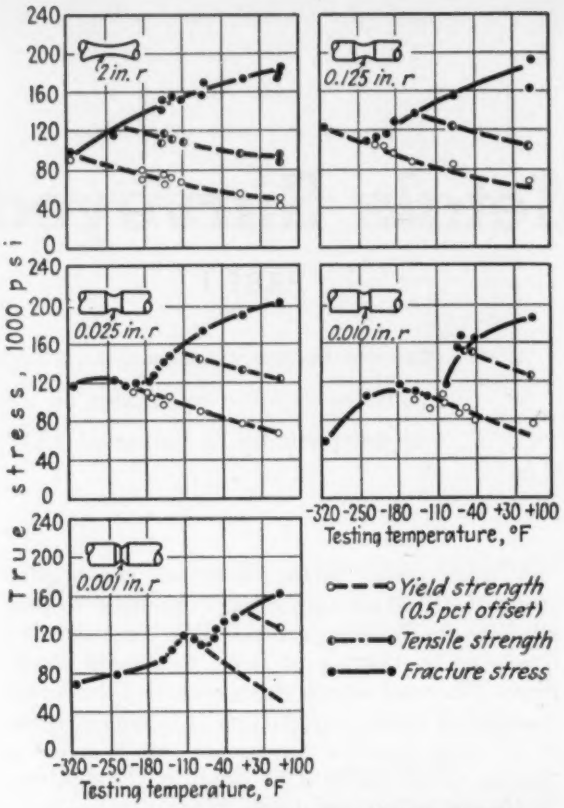


FIG. 2—Curves showing the varied effect of notch radius on the low temperature strength properties of a 2.75 pct Si steel. Tuer, Ripling and Sachs[3].

These data also show a temperature range over which the tensile strength increases with decreasing testing temperature and another in which it decreases. As stated previously, the temperature interval over which the tensile strength decreased lowered the ductility to such an extent that the tensile strength became dependent on the ductility.

This indicates that the metallurgical variables which contribute to good low-temperature behaviors are the same as those which have been found helpful in making steels perform better at room temperature under severe stress condition. Hence, steels to be used at low temperatures should preferably be thoroughly deoxidized and fine grained. The distribution of the carbides should be spheroidal rather than lamellar. This effect of microstructure has been vividly shown by Gillett and McGuire,[4] Juppenlatz,[5] and more recently by Sinclair and Dolan.[6]

These latter investigators treated three steels, SAE 1045, 2340 and 3140, so that Charpy impact test specimens of these steels in both the pearlitic and martensitic conditions had a hardness of approximately 100 Rb. For all three steels at the same hardness, the martensitic material was found to have a lower transition temperature, as well as a greater toughness, at temperatures

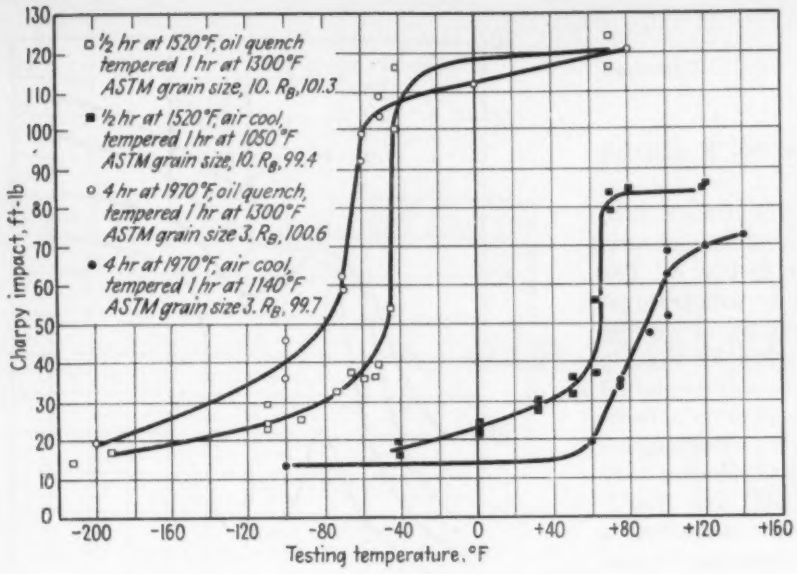

½ hr at 1520°F, oil quench tempered 1 hr at 1300°F ASTM grain size, 10. R_B, 101.3
½ hr at 1520°F, air cool, tempered 1 hr at 1050°F ASTM grain size, 10. R_B, 99.4
4 hr at 1970°F, oil quench, tempered 1 hr at 1300°F ASTM grain size 3. R_B, 100.6
4 hr at 1970°F, air cool, tempered 1 hr at 1140°F ASTM grain size 3. R_B, 99.7
Charpy impact, ft-lb
Testing temperature, °F

FIG. 3—Effect of microstructure and grain size on the transition temperature of SAE 3140 steel, left. The martensitic material has a lower transition temperature, and greater toughness at temperatures above the transition temperature. Sinclair and Dolan[5].

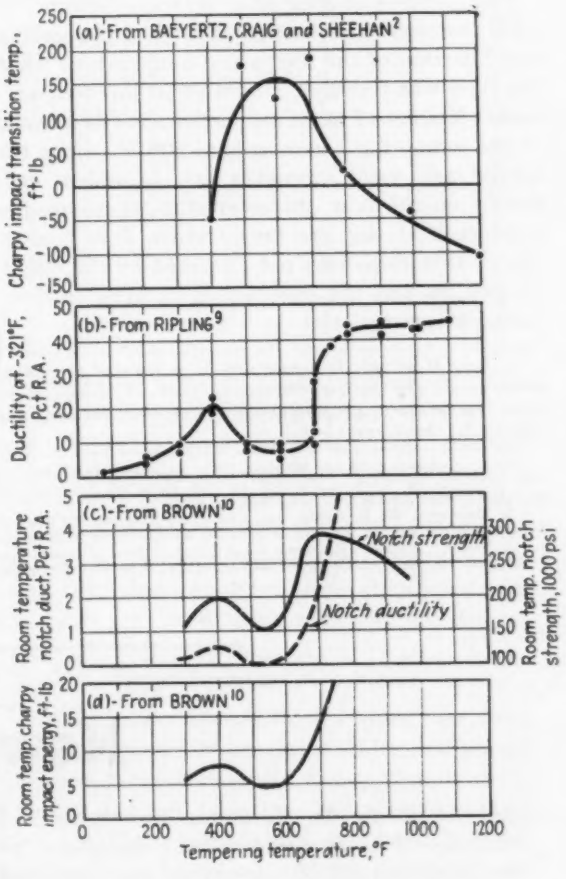


FIG. 4—Properties of quenched SAE 1340 as a function of the tempering temperature, below.

above the transition temperature, than the pearlitic steels. The data for SAE 3140 are shown in Fig. 3. The marked effect of austentic grain size is also shown.

One of the most recent investigations of this type was performed by Baeyertz, Craig and Bumps,[1] who obtained the Charpy impact transition temperatures of two groups of spheroidite. One group of the spheroidite was prepared from martensite while the other was obtained from pearlite. These two groups were formed under conditions such that the two spheroidites had approximately equal hardness and approximately the same carbide shape and distribution. Even under these conditions, the spheroidites formed from the martensite had a considerably lower transition temperature than the spheroidites from the pearlite.

One other factor found helpful in improving room temperature behaviors, quenching from the temper in order to avoid temper embrittlement, also aids low temperature performance.[8]

The effect of tempering temperature on the properties of quenched low alloy structure steels at low temperatures as well as at room temperature in the presence of severe stress conditions has been investigated in some detail. Recently, Baeyertz, Craig and Sheehan[2] presented some data which showed the transition temperature (Charpy impact) of a large number of the low alloy structural steels which had been tempered at a series of different temperatures. When their data were plotted so that the transition temperature was represented as a function of the tempering temperature, all of the steels showed curves similar to that in Fig 4(a) with a transition temperature maximum always occurring at a tempering temperature around 600°F.

A mirror image of this curve was obtained by the author[9] when the low temperature ductility of SAE 1340 was plotted as a function of the tempering temperature, Fig. 4(b). This steel was also subjected to static notch tests and Charpy impact tests by Brown,[10] who showed that the 400°F max and the 600°F min was also present in the notched strength and ductility as well as in the Charpy impact properties, Figs. 4(c and d). Room temperature impact tests by Grosman[11] and the very extensive impact tests by Schrader, Weister and Siepmann[12] give further

Continued

evidence of this 400°F max and 600°F min for the low alloy structural steels.

The unnotched tensile properties of SAE 1340 were obtained by the author at a number of temperatures other than that shown in Fig. 4. The ductility minimum at tempering temperatures around 600°F was found to persist at all the subzero temperatures up to —110°F, Fig. 5. When the data shown in Fig. 5 were cross-plotted so that the ductility was represented as a function of the testing temperature, with the tempering temperature being used as a parameter, only the steel tempered between 400° and 700°F showed transition temperatures. Actually, a more severe testing condition produced transition temperatures in this testing interval for all tempering temperatures, as evidenced in Fig. 4(a).

The yield strength and tensile strength of SAE 1340 have also been presented by the author[9] as a function of the tempering temperature when the steel was tested at a number of low temperatures. Neither of these properties showed minima in the tempering range around 600°F. Since the tensile and yield strengths are dependent primarily on the flow characteristics, these results indicate that the low temperature flow properties of this steel were not damaged by the 600°F temper, as was the contraction in area (a fracturing characteristic).

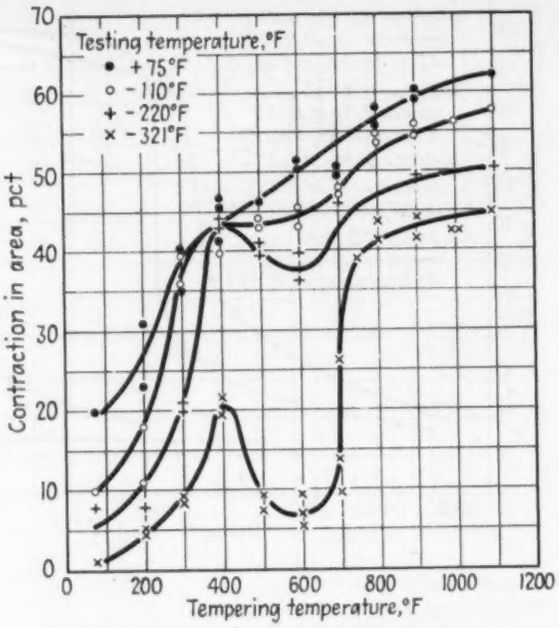


FIG. 5—Effect of tempering temperature on the low temperature ductility of SAE 1340 steel. Samples were tempered for 1 hr and quenched in water. Ripling[9].

In Part II of this two-part article, scheduled to appear next week, the author discusses effect of composition, low temperature properties of nonferrous metals, and rheotropic brittleness.—Ed.

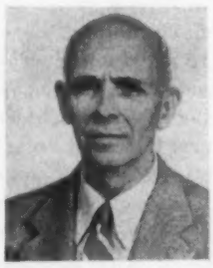
[1] P. G. Jones and W. J. Worley, "An Experimental Study of the Influence of Various Factors on the Mode of Fracture of Metals," Proc., ASTM, vol. 48, 1948, p. 643.
[2] M. Baeyertz, W. F. Craig, Jr., and J. P. Sheehan, "Effect of Alloying Elements on Impact Properties of Quenched and Tempered Steels," Armour Research Foundation, Office of Naval Research, U. S. Navy, Contract N6-onr-274/T. O. 1, Technical Report No. 22, September 1949.
[3] G. L. Tuer, E. J. Ripling and G. Sachs, "The Low Temperature Static Notch-Tensile Characteristics of a 2¾ Per Cent Silicon Low Carbon Steel," Case Institute of Technology, Office of Naval Research, U. S. Navy, Contract N6-onr-273/T. O. 1, Technical Report No. 16, March 1949.
[4] H. W. Gillett and F. T. McGuire, "Behavior of Ferritic Steels at Low Temperatures," ASTM, December 1945.
[5] J. W. Jungenlatz, "Water Quenching Small Steel Castings," Steel, May 22, 1944, p. 84.
[6] G. M. Sinclair and T. J. Dolan, "The Influence of Austenitic Grain Size and Metallurgical Structure on the Mechanical Properties of Steel," University of Illinois, Office of Naval Research, Contract N6-ori-71, T. O. IV, December 1949.
[7] M. Baeyertz, W. F. Craig, Jr., and E. S. Bumps, "Effect of Ferrite Grain Structure upon Impact Properties of 0.08 Pct Carbon Spheroidite," Armour Research Foundation, Office of Naval Research, Contract N6-onr-274/T. O. 1, April 1950.
[8] J. H. Hollomon, "Temper Brittleness," Trans. ASM, vol. 36, 1946, p. 473.
[9] E. J. Ripling, "Tensile Properties of a Heat Treated Low Alloy Steel at Subzero Temperatures," Trans. ASM, vol. 42, 1950.
[10] W. F. Brown, Jr., Discussion to reference 9.
[11] M. A. Grossman, "Toughness and Fracture of Hardened Steels," Trans. AIME, Iron and Steel Div., vol. 167, 1946, p. 39.
[12] H. Schrader, H. Wiester and H. Siepmann, "Embrittlement of Heat Treated Steels when Tempered at 250 to 400° (Centigrade)," Archiv. für das Eisenhüttenwesen, vol. 21, 1950, p. 21. Translation appeared in THE IRON AGE, Sept. 14 issue, p. 92.

New Books

"*Colorimetry*, by D. B. Judd. Standards and methods of color measurement developed by National Bureau of Standards are described in the booklet, giving the basis for each technique and showing how one method supplements the other. Chapters cover the following topics: The standard observer; illuminants and coordinate system; small-difference colorimetry; material standards of color; one-dimensional color scales; and general methods. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. 30¢. 56 p.

"*The Inelastic Behavior of Engineering Materials and Structures*," by A. M. Freudenthal. Book discusses the purpose of the study of mechanical behavior and the basic concepts and definitions; develops the structural and phenomenological framework of the mechanics of inelastic behavior of engineering materials; and deals with specific problems of inelasticity, design of structures and machine parts under various conditions, and mechanical testing. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. $7.50. 588 p.

Induction Heat Cuts Soldering Cost in Half



Replacing a hand gas torch with induction heating for soldering name plate mounting studs eliminated warpage, cut solder cost, increased production rate. Overall production cost was reduced 52 pct.

By **CHARLES H. YETMAN**
Heatronic Engineering,
Holland Patent, N. Y.

REPLACING a hand gas torch with induction heat has brought about a 52 pct reduction in production costs of a soldering operation at The American Emblem Co. The biggest saving was a 20-pct reduction in scrap loss, but there were additional savings from an increased production rate, decreased fixture cost, and other factors.

The operation consists of soldering two mounting lugs on the backs of stamped brass name plates, or emblems. When done by hand with a gas torch, the unequal distribution of heat often caused severe warping of the emblems. The result was an average 20 pct of the pieces rejected to scrap.

The usual method of holding a piece for torch soldering is to nest it in a metal fixture, holding it in position by pins, or by a complete nest, touching the perimeter. Above this is constructed a bridge, in which the guides that hold and locate the mounting studs are positioned. The entire fixture is made of metal, and it quickly absorbs heat from the torch. The fixture expands, thus adding greatly to the problem of distortion in the piece. The heat and expansion makes removal from the fixture difficult, shutdown to allow cooling often being necessary.

Turning to induction heating, American Emblem installed a Tocco 7½-kw, 9600-cycle induction generator, of the motor-generator type. To give a margin over the solder flow point of 1175°F, the piece is brought to a temperature of 1200°F in a heating cycle of 24 sec. Fixtures used are nonmetallic. Since by induction heating the entire part is uniformly heated at all times, warpage problems were eliminated, and scrap loss due to warpage was reduced to zero.

Three Emblems Are Made

The operation involves three separate emblems, all stamped from brass 0.023 in. thick and heavily embossed. One emblem is nearly flat, with an irregular contour, and has two steel mounting studs 1 9/16 in. apart, on an axis vertical to the embossed A. A second emblem is round and convex, formed on a 6-in. radius. Its two brass mounting studs are silver-soldered on the back of the plate, spaced 2½ in. apart on an axis horizontal to the embossed A. The third emblem is of irregular contour and convex, formed on a 7-in. radius. The mounting studs on its back are 1⅛ in. apart on an axis horizontal to the embossed A.

In induction soldering of nonferrous materials, especially brass as thin as 0.023 in., the problem

is mainly to prevent burning of the piece. Experience has shown that any warpage whatsoever will change the coupling under the work coil and may result in a burn. This makes it imperative that the piece lie flat and not warp up toward the coil. Use of a nonmetallic fixture, designed so that the piece can expand without warping, meets these conditions.

Special fixtures were made from Transite, designed with holes to accommodate the stud positions of all three emblems. The economy in a fixture that will handle three different pieces, with different stud spacings, is obvious. The Transite material is easily cut with a saw and finished at the edges with a special grinding wheel.

A drill template was used to make the fixtures. There were six holes for the mounting studs, three for the copper pins, and one for attaching the fixture to a ceramic stand-off, which is used between the fixture and the conveyer belt. The template layout was made from the customer's drawings, with the depth of each hole stamped on the template.

Fixtures Attached to Belts

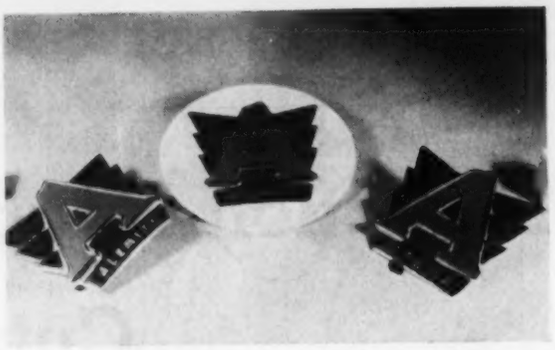
The fixtures are attached to a conveyer belt. The setup is an undercoil arrangement, in which the flux of the work coil repels the piece and thus helps to hold it in its correct place on the fixture. If the workpiece were of steel, an over-coil arrangement would have the same holding effect, since the flux attracts steel.

The belt cost is less than $3, so that it is economical to have separate belts for different operations with the fixtures permanently attached, rather than changing fixtures on one belt for different operations. Switching belts takes less than 5 min.

The fabric belt is dielectric and is not affected in any way by the flux or current from the work coil. It conforms itself to the platen on which it moves when under the work coil, permitting close adjustment of workpiece position under the coil.

In operation, two studs are first placed in the proper holes in the fixture, the choice of holes depending on the emblem to be soldered. A prefabricated silver-solder disk, 0.020 in. thick, is placed on the top of each stud. The disks are taken from a dish full of flux, and the flux serves to hold the disks in position on top of the studs.

Next, the name plate is placed on the studs. It is positioned by three copper locating pins in the fixture which fit in corners of the embossed design which are in the same location on all three emblems. Copper pins are used because of the low resistivity of copper. In this case 0.100-in. wire is used. The wire, being fairly



THE THREE name plates to which mounting studs are soldered with induction heat. The A in each emblem is the same, simplifying positioning of locating pins in soldering fixtures.

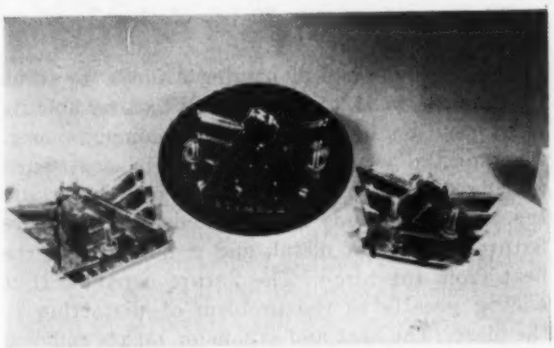
soft, is easy to adjust to obtain a close fit, and does not restrict expansion of the workpiece. The pins are perpendicular to the flux so that they are not unduly heated during the cycle. It has never been necessary to replace one of these pins.

There has been considerable discussion over the proper frequency to use for induction soldering thin brass, copper or aluminum. While the author has used 450 kilocycles for soldering brass to aluminum, 9600 cycles has been entirely satisfactory in the present instance.

The induction work coil is of the flat type, with two parallel bars made from ¼ x ½-in. copper tubing. The coil is 1½ in. wide and 12 in. long. The conveyer is driven at the necessary speed to give a cycle time of 24 sec.

Though a 24-sec heating cycle may not seem like high production, actually the production rate is dependent on the spacing of fixtures on the belt. When the fixtures are spaced so as to bring more than one under the work coil at the same time, this will obviously produce more than one soldered piece in one cycle.

Having two or more pieces moving under the work coil at one time gives a varying load on the work coil. This is intentional, and is a part of the designed cycle for this particular job. The varying load makes possible a reduction of heat in each piece at exactly the right time to prevent burning. The higher production rate enabled by

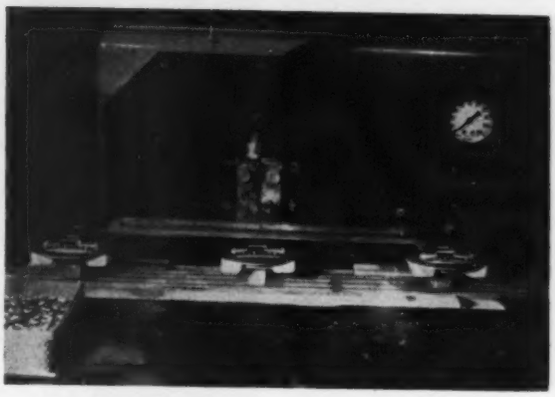


THE REVERSE SIDE of the three name plates, showing the different location of mounting studs on each plate.

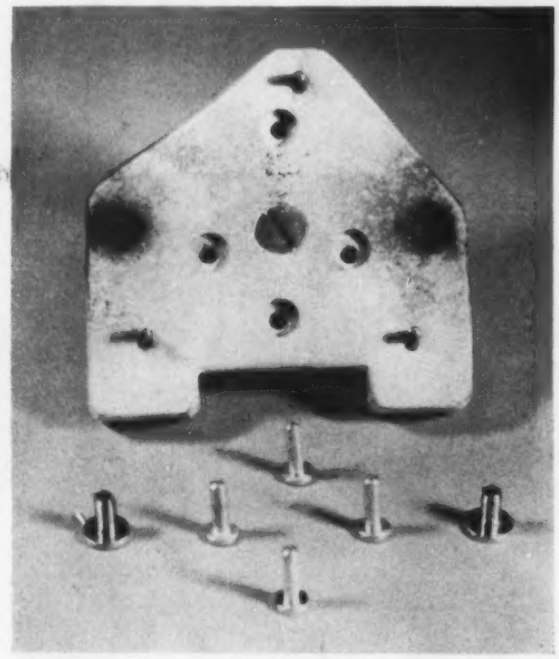
having more than one piece under the coil at one time would not be possible with a setup where off-and-on current was used.

It is not possible to speed up production at will by increasing the speed of belt travel. While the equipment is built to permit instant changing of current and of belt speed, once the heat pattern has been worked out, neither of these factors can be changed without causing deviation from the desired heat pattern.

To obtain correct coupling accurately, fine adjustment of position must be possible. The Tocco machine's separate work station has a vertical micrometer adjustment. In addition, the platen over which the belt passes is made for fine adjustment.



THE WORK STATION of the induction heater, showing the work coil, and three emblems mounted on fixtures on the fabric belt. Fixtures are securely attached to the belt, separated from it by ceramic standoffs.



ONE OF THE soldering fixtures which can be used with any of the three emblems. Locating pins fit all emblems. Three pairs of stud holes are provided, one for each size of emblem.

With these fine adjustments, there is little difficulty in working the position to give the coupling which will produce just the right amount of heat for solder flow. The piece can be close-coupled when first entering under the work coil, or the reverse is possible. A few pieces are enough to establish the proper heat pattern as long as the work station and platen have micrometer adjustment and a belt is used which conforms perfectly to the platen position. In this installation, too, the belt speed is readily adjustable by means of a hand wheel.

In addition to the savings made possible by elimination of scrap loss due to warpage, adoption of induction soldering has cut solder cost in half for this operation. The production rate on these parts has been increased 40 pct. Adaptation of the fixture to three different emblems reduced fixture cost 70 pct. Overall, production cost was reduced 52 pct by the method described.

Silicone Lubricant for Conveyer in 700°F Furnace

As a result of satisfactory operating service with a lubricant of silicone fluid, a drawing furnace will be constructed for operation at temperatures up to 700°F, in which the conveyer will move through the furnace instead of outside it.

Laboratory tests and limited experience in industrial plants has indicated that the lubricant, Dow-Corning 710G silicone fluid, is satisfactory for conveyers under light loads at temperatures ranging from zero to 700°F. Bearings are first lubricated with 710G, and relubricated as required with Dow-Corning 710, which is the same as 710G but without graphite.

In service, trolleys lubricated with 710G have shown no tendency to harden or "lacquer up." The lubricant remains liquid and free from stickiness so that the graphite contained in solution functions satisfactorily under a broad range of operating conditions.

The usual operating practice has been to inject about ¼ fl oz teaspoons of 710G into each trolley. Bearings with retainers are used, so that the fluid will not contaminate the Bonderite or cleaning fluid.

Operating experience to date indicates that this type of conveyer lubrication is satisfactory up to 700°F, under loads as high as 400 lb. Previous experience with mineral oils under these conditions had resulted in excessive carbonizing and sludge formation, and the use of additional graphite failed to satisfy the operating requirements.

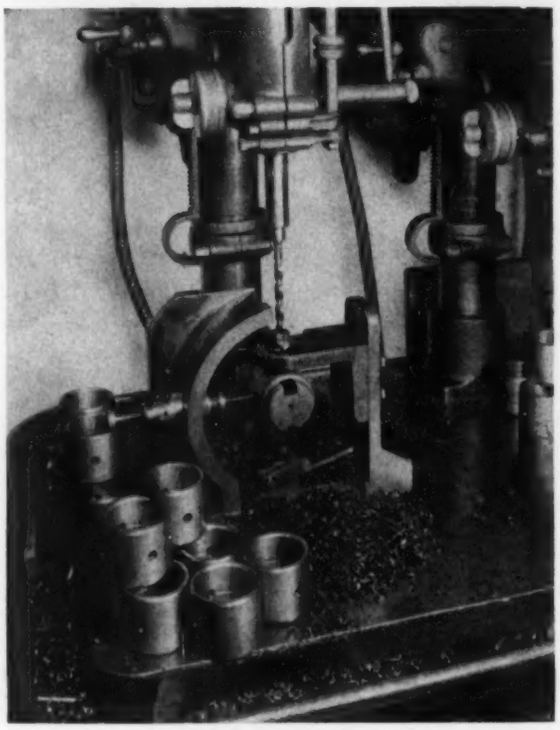
DRILL JIG Used for 57 Different Parts

REED-PRENTICE CORP. has saved much tool design and manufacture time, and tool storage space, by designing a universal fixture which will accommodate 57 different parts requiring the drilling of spanner wrench holes. All these parts are round, have a hole in the center and require drilling of a number of holes equally spaced on their periphery. But their diameters, bores, and the number and size of the holes to be drilled differ. The drill jig is based on the similarity of these parts, and readily adjustable to their differences.

The cast iron jig has four major components, as shown in the photograph. At the left is a double quadrant, holding an indexing pin of adjustable length. At the right is a bracket with an arm of adjustable height which holds a removable bushing for guiding the drill. At the rear is an arbor-holding bracket, adjustable in the horizontal and vertical planes. In the base of the jig, in a vertical line with the bushing, is a positioning pin assembly, with an adjustable pin operated by a hand lever.

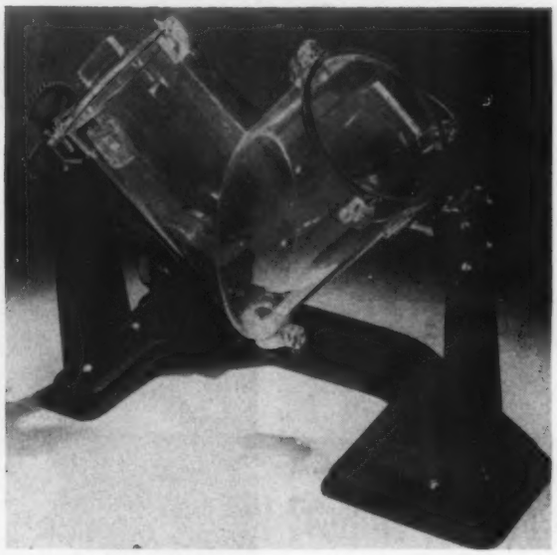
To prepare for operation, an arbor of the correct size for the particular part to be run is fastened to the rear bracket. The bracket is locked in a position to suit the distance the holes are to be drilled from the face of the workpiece. The arm on the bracket at the right is adjusted vertically to a position to suit the workpiece diameter, and a slip bushing of the correct size for the hole to be drilled is inserted.

If three or more holes are to be drilled, the indexing attachment at the left is required. On the quadrant, an angular scale ranging from 30° below horizontal to 60° above horizontal is scribed. Since all holes are equally spaced, if three holes are required the pin is set at 30° below horizontal, making it 120° away from the drilling position. When a hole is drilled and the part is turned so that the indexing pin can be pushed into the hole just drilled, the location for the next hole is in proper position under the drill and bushing. If, say, 9 holes are to be drilled, they will be 40° apart, and the pin is set at 50° above horizontal, which makes it 40° away from the drilling position, and again, turning the part so the pin can be pushed into the hole just drilled properly indexes the part for drilling the next hole.



DRILL JIG is adjustable to 57 parts, similar in type, but varying in size, number of holes.

When two holes are to be drilled, the bottom locating pin, which is 180° away from the drilling position, is used in the same manner as the indexing attachment, the pin being pushed into the hole by means of the hand lever.



Chemical Blender Features Visibility

CYLINDRICAL shells of 0.187-in. Plexiglas, fused together at a right angle to form a V-shaped barrel, constitute the basic unit in a new dry blender being manufactured for laboratory use in the process industries. The twin-shell blender, designed to handle dry solids, uses the acrylic plastic barrels in 4-qt and 8-qt sizes. Each is rotated at 32 rpm by a chain and sprocket drive from a gearhead motor.

Design engineers of Patterson-Kelly Co., Inc., East Stroudsburg, Pa., selected the acrylic plastic for these barrels after considering many types of materials. With it, they got (1) the important factor of complete visibility of the blending action; (2) lower production costs because of the ease with which the plastic is formed; (3) freedom from corrosion, contamination and discoloration; and (4) ease of cleaning.

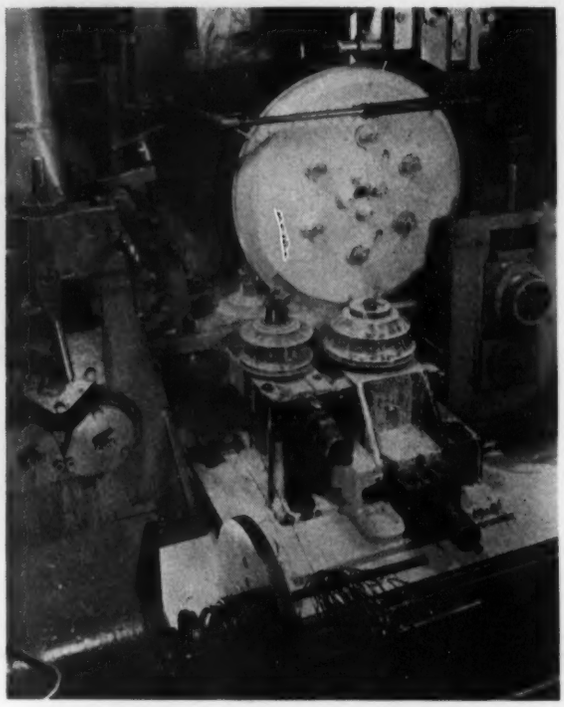
Shape of the barrel is said to provide a combined tumbling and rolling action, with a simultaneous transverse movement within the entire mass of material. In addition, a folding action results from the alternate combining and dividing of the mass as the blender rotates. Removable Plexiglas covers at each end of the barrel secured by wing nuts, facilitate change from one product to another without contamination. The 24-in. high unit uses a standard cast aluminum base with an adjustable mount.

NBS Develops Precision Thermostat

AN improved precision thermostat developed by the National Bureau of Standards provides smooth, continuous electric furnace control between 1000° and 1550°C. The furnace winding itself serves as the sensitive element, forming part of a bridge circuit for control of a thyratron tube. The thyratron circuit acts as a continuously variable valve, allowing just enough current to reach the furnace to compensate for a given temperature fluctuation. The new thermostat is highly sensitive and independent of normal fluctuations in line voltage. It is convenient to operate and easily adjusted for any temperature. Furnace temperatures can be maintained constant within ± 0.1°C for several hours, and within ± 1.0°C for several days.

The output of the a-c bridge, one arm of which serves both as a resistance thermometer and as a heater element for the furnace, is amplified and applied to the control grid of the thyratron. When the resistance of the furnace winding changes slightly with temperature, the resulting unbalance of the bridge produces a difference in phase between the control voltage and the anode voltage of the thyratron. This phase difference determines the firing period of the thyratron. The thyratron action is reflected to the bridge circuit through a transformer.

Plant Makes Its Own Welded Tubing



WELDING STATION on Chevrolet's tube mill. In background is welding wheel. In foreground, is chip collecting reel.

FAST and continuous production of welded steel tubing from coiled steel strip stock is now being done at the Chevrolet-Flint Mfg. Div. of General Motors, using a new McKay tube mill. In this machine, stock is fed from a reel and first passes through a set of rolls that form the cylindrical tube. At the welding station, still guided by horizontal grooved wheels, the longitudinal joint is seam welded as it passes under a welding wheel turning at a speed equal to the rate of tube travel.

Jets of coolant play on the wheel and keep it at desired working temperature, although, at the weld, the wheel is in contact with the steel at welding temperature. Welding leaves a bead of flash which is cut off, flush with the outer diameter. This is done by a high speed steel tool that remains in contact with the tube at a point about a foot from the welding position, while the bead is still at or close to red heat.

A continuous chip is produced by this scarfing tool and, to keep the chip from tangling in the machine, it is drawn off onto a reel. This reel is driven by a friction clutch, under spring pressure, which can slip if the reel tends to pull the chip faster than it is formed.

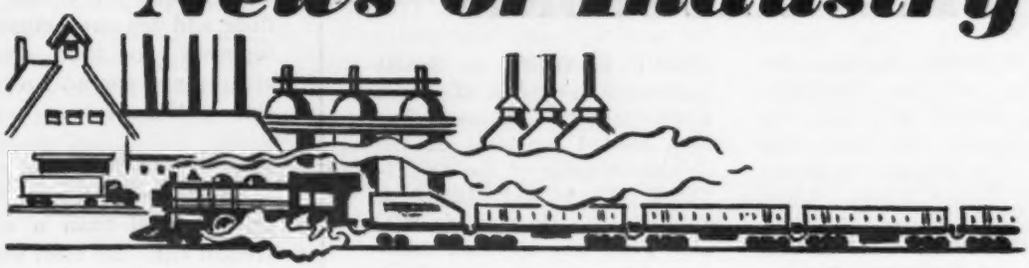
When forming tube to be used as steering columns, the strip is 0.080 to 0.090 in. thick and the tube is formed at a speed of 45 fpm. The same mill can form and weld tubes of thinner wall at speeds up to 120 fpm. After leaving the trim tool, the tube continues to a station where a carbide cutter is employed to cut off tubes to length. In this flying cutoff, the cutter is advanced longitudinally while cutting, being supported on a table that moves at precisely the same speed as the tube. At the end of its cut, the tool returns automatically to its starting point to begin its next cut.

Lengths cut off are passed by hand to an inclined track from which they feed automatically into a special machine one at a time. In this machine, the tube is rotated as tools are fed inward from each end. Air-operated tools ream out weld flash from short distances inside the tube, chamfer the ends, and face them square relative to the axis. As soon as these cuts are completed, the tools retract automatically and the tube drops onto a continuation of the inclined track from which it drops into a carrier set to receive the finished tubes.

At the end of the track, an inspector checks occasional tubes to make sure that the tools in the machine are cutting as required. With this setup, about 700 steering gear mast jackets, as they are called, are completed per hour. After bundling, tubes of this type are shipped to the Saginaw Steering Gear Division for assembly into steering wheel columns.

With the McKay mill described, and five smaller ones of a similar type, the same department also produces welded tubes for such parts as exhaust and tail pipes, and gas and oil filler tubes employed in Chevrolet cars and trucks.

News of Industry



Denounces "Red Market"

Chicago—A scathing attack on industrial racketeers who buy more steel than they can use to hoard and sell at exorbitant profit are operating a "vicious red market" which would do less harm by shipping its steel straight to Moscow, said Hiland G. Batcheller, chairman of the Allegheny Ludlum Steel Corp., at the meeting of the Purchasing Agents' Assn. here.

"This red market is creating such distrust in and of the steel industry that it is giving powerful ammunition to those who would lead the industry into complete government control," he said. "The total tonnage is small but the damage is immeasurable."

Grants Salary Increase

Pittsburgh—Westinghouse Electric Corp. and the Federation of Westinghouse Independent Salaried Unions have signed a new 1-year agreement calling for a salary increase of $17.35 a month, or 5 pct of the monthly salary, whichever is greater, for some 12,000 salaried employees in 21 plants. The contract is effective Oct. 1, but the wage increase is retroactive to Sept. 18.

British to Lower Zinc Use

London—British zinc consumers will in the near future be able to buy only nine-tenths of their average monthly consumption during 1949, announced the Ministry of Supply in recognition of the zinc shortage.

New Unicel Freight Car Shown in New York

Could mean big changes in present carbuilding practices . . . Is lighter and carries heavier load . . . Engineering is secret of strength . . . Uses 20 tons less steel.

New York—Early this week Pressed Steel Car Co. introduced a new Unicel freight car which could portend sweeping changes from the classic concept of carbuilding and rail shipment. The premiere of the prototype of the new Unicel car emphasized the following advantages over conventional freight cars: (1) Less weight but heavier pay load, (2) larger inside dimensions, (3) conservation of strategic materials, (4) cheaper to buy and requires less manhours to build, (5) lower handling costs and less damage to goods in shipment.

Stronger Than Conventional

Engineering and construction of the Unicel car is based on the latest developments of the relatively new science of cellular laminates. Light weight super-strength woods, phenolic resins, insulators are all combined into a structure and subjected to tremendous pressure and electrical energy. This, plus new structural design produces a car which is claimed to be stronger than the conventional freight car made chiefly of steel.

Engineering is the key to the new car. While conventional cars derive their strength from the strength of their members, the Unicel car gets its strength from its shape. If you place a pencil on a sheet of paper, the paper will bend and let the pencil fall. But if you form the paper into an L-shaped tube it will easily support the pencil. This is the prin-

Unicel Freight Car vs Conventional Car

	A Conventional Freight Car	The P.S.C. Unicel Car Used as a Freight Car	A Conventional Ice-Bunkered Refrigerator Car	The P.S.C. Unicel Car Used as a Refrigerator Car
Inside Length	40' 6"	50' 6"	40' 0"	49' 0"
Weight of Car	L.W.—45,000 lbs.	L.W.—37,000 lbs.	L.W.—58,700 lbs.	L.W.—41,000 lbs.
Inside Width	9' 2"	9' 2"	8' 4"	8' 9½"
Inside Height	10' 0"	10' 0"	7' 9"	9' 6"
Floor Area	371 sq. ft.	463 sq. ft.	283.5 sq. ft.	396 sq. ft.
Useable Volume (Cu. Ft.)	3715 cu. ft.	4630 cu. ft.	2200 cu. ft.	4080 cu. ft.
Load Limit	124,000 lbs.	132,000 lbs.	77,300 lbs.	128,000 lbs.

Data by Pressed Steel Car Co.

INDUSTRIAL SHORTS

BEST WISHES—The 50th anniversary of the YOUNGSTOWN SHEET & TUBE CO. was celebrated last week with an open house at the company's Indiana Harbor works. About 9000 visitors toured the plant where they observed the making, rolling and processing of steel.

BRANCHES ABROAD — Two export corporations to operate as Thor sales and service branches have been organized by INDEPENDENT PNEUMATIC TOOL CO., Aurora, Ill. Thor Tool Continental, Inc., in Antwerp, Belgium, will be directed by Vance G. Turner. Donald E. Randall will manage Thor Tool Hemisphere, Inc., in Sao Paulo, Brazil.

FIELD SALES UNIT—An independent field sales organization has been set up by MINNEAPOLIS - HONEYWELL REGULATOR CO for its Valve Div. The nucleus of the new organization will consist of regional sales managers and a staff of about 20.

INCREASES CAPACITY—The Dixon Chain Mfg. Co., Inc., Dixon, Ill., has been purchased by the COLUMBUS McKINNON CHAIN CORP., Tonawanda, N. Y. Columbus McKinnon expects to be operating this new plant soon.

MACHINERY AGENTS—Kling Bros. Engineering Works, Chicago, has named the SIMMONS MACHINE TOOL CORP. of Albany, exclusive overseas distributor for all their metalworking machinery. Simmons export offices are located at 50 E. 42nd St., New York.

TOP HONORS—The Financial World Survey of Annual Reports has awarded ARMCO STEEL CORP., Middletown, Ohio, the bronze "Oscar of Industry" trophy for having the best annual report of the steel industry. U. S. Steel Corp. was runner-up, while Keystone Steel & Wire Co. placed third.

GROUP LEADERS — Ernest Krulewitch, president of Simon Krulewitch, Inc., Chicago, has been elected president of the Chicago chapter of the INSTITUTE OF SCRAP IRON & STEEL, INC. He succeeds William Pohn who becomes chairman of the executive committee. Barney Silver was named first vice-president; Michael Rosenberg, second vice-president; and Ralph Michaels, third vice-president.

ACQUIRES INTERESTS—Woolson H. Davis, formerly sales manager and secretary of the E. T. Rugg Co., Newark, N. J., has purchased control of the RUGER EQUIPMENT CO., Uhrichsville, Ohio, manufacturers of hydraulic cranes. Mr. Davis has been elected president and treasurer of the Ruger company.

SALES AGENCY—The Berger Mfg. Div. of Republic Steel Corp. has appointed the ARMSTRONG EQUIPMENT SUPPLY CO., INC., Denver, as the exclusive industrial sales agency in Colorado.

OPENS WAREHOUSE—A new warehouse and assembly plant in Dayton has been opened by the PRODUCTO MACHINE CO., Bridgeport. It is now equipped to stock, assemble and distribute die sets. Neil Griest is branch manager.

PURCHASE—The name, good will and inventory, but not the liabilities of Pacific Fittings, Inc., San Francisco, have been taken over by the GENERAL METALS CORP. The corporation, formerly known as Pacific Fittings, Inc., has changed its name to Vermont Industries, Inc., and will, in due course, be put into liquidation.

SOUTHWESTERN REP — The Reliance Electric & Engineering Co., Cleveland, has appointed the BOYD ENGINEERING CO., INC., as sales representatives in Arizona, New Mexico and the western part of Texas.

ciple behind the Unicel car. Sides, floor and top are actually moulded together so that stresses and strains are spread over the entire skin of the car.

Less Steel Used

The Unicel car uses 20 tons less critical steel than a conventional freight car. Its steel weight, nearly all of it in the undertruck, is about 18,000 lb.

Following completion of the first test model in July, the Unicel car has undergone a series of tests with flying colors, although the real and final test of a freight car is to place it in rough service for 20 years or more.

Delivery time for the new cars is expected to be about 6 months. Facilities at the Hegewisch, Ill., plant of Pressed Steel Car Co. are sufficient to turn out 50 cars a day on a 5-day week.

Efficiency Stressed to Offset Lowered Quality of Raw Materials

AISI meeting told of boosted output of continuous rolling mill.

Pittsburgh — Heightened efficiency can offset decline of raw material quality and unfamiliarity with new equipment, it was emphasized at the regional technical meeting of the American Iron and Steel Institute.

H. A. Carter, roll department superintendent of Bethlehem Steel Co.'s Lackawanna plant, said that with experience resulting in increased efficiency the 10-in. continuous bar mill at Lackawanna is rolling 36.5 tons per hr in 1950 as compared with 31.5 tons in 1948.

Openhearth Furnaces

H. E. Warren, Jr., Carnegie-Illinois Steel Corp., said that 12 furnaces of about 200 tons capacity each would be the maximum efficient size for a new openhearth shop.

New York State sinter is more desirable and economical, according to K. G. LeViseur, Republic Steel blast furnace superintendent, Warren District.

C. A. Covington, superintendent,

and A. H. Parthum, assistant superintendent, Campbell Coke plant of Youngstown Sheet and Tube Co., described shutting down coke ovens for protracted periods.

K. L. Fetters, assistant to vice-president, Youngstown Sheet and Tube Co., discussed the physical chemistry of the making of steel.

The meeting was the first of four scheduled to be held in various parts of the country this year. Later meetings are scheduled for Birmingham, Oct. 25; San Francisco, Nov. 10, and Chicago, Dec. 1.

Washington Snubs Don't Stop Tool Committee

Continues planning for mobilization despite Washington cold shoulder . . . Forms advisory group for foothold in NPA planning . . . Appeals for more materials—*By George Elwers.*

Toronto—The Joint Industry Machine Tool Preparedness Reserve Group made another attempt recently at establishing liaison with Washington. Meeting here at the forty-ninth session of the National Machine Tool Builders Assn. last week, the group continued its planning for industry mobilization in the event of a full national emergency with three invited representatives of the National Security Resources Board and the National Production Authority present and participating in the discussions.

As a result of the meeting a four-man advisory committee was formed to work with the NPA machinery section on matters of organization and procedure. H. L. Tigges is chairman and E. B. Crane, Edgar Seifreat and R. Vidinghoff are members. Current problems as well as plans for full mobilization came before the Toronto meeting.

More Materials Needed

The Washington observers heard the group agree that curtailment of machine tool building may start in 90 to 120 days if the industry doesn't get more materials. They were told that the DO priority system is useless to machine tool builders and they heard renewed appeals for reconditioning of JANMAT machine tool reserves. The return of E-1-b priorities in the event of war was endorsed.

What will result in Washington as a result of this meeting is doubtful. Past history is not encouraging. The joint industry group comprises representatives of machine tool builders, distributors, used machinery dealers, and tool and die makers. It was formed 2 years ago as an advisory branch of NSRB. As politics and lack of funds cut NSRB activities, the group was left to wither on the vine and eventually lost its official connection. But the group refused to die.

Under chairman H. L. Tigges and by authority of industry associations represented, it continued to function—ready to form the nucleus of a machine tool advisory division should all-out war come. Four meetings have been held in the past 2 years and in the interim the group divisions have been concerned with reports and statistics, priorities, pool orders, and diversions. These activities have received scant recognition from Washington. For example the group continually urged rebuilding of woeful JANMAT reserves while the industry was slack and had time to do the job. Washington did not act. But the committee refused to die.

Formation of the four-man advisory committee may be a step in the right direction. From its current consultations with Washington officials, aid to alleviate the industry's distress may be the result and a permanent advisory committee with official standing may be formed.

The Staff of Life

Troy, N. Y.—A manufacturer here has adopted a literal meaning for the "bread is the staff of life" saying and has worked out a wage escalator clause that pays no direct attention to complex cost of living indexes. C. W. Kelsey, president of Rototiller Inc., farm and garden machinery manufacturer, has stabilized wages on the basis of bread at 16¢ per lb.

It was shown that the $45-per-week worker could buy 281 one-pound loaves at 16¢ each. If the bread price advances, so does his pay check—to keep its buying power at 281 loaves of bread. Mr. Kelsey believes the baking industry is offered a great opportunity in standardizing at 1-lb loaves and thus aiding wage adjustment.

Defense Ordering Negligible, Tell Berna Tells NMTBA Meeting

Toronto—Listless issuance of defense orders has had only a minor effect on the machine tool industry, a situation likely to alter with expansion of the defense program, declared Tell Berna, general manager of the National Machine Tool Builders Assn., at the group's meeting here last week.

Richard E. LeBlond

Speakers stressed the importance of European rearmament complementing U. S. defense production but said U. S. manufacturers of machine tools were tripped up in exporting to Western Europe by a chaotic export licensing system.

More than 350 members voted Richard E. LeBlond, president of the R. K. LeBlond Machine Tool Co., into presidency of the NMTBA, succeeding David Ayr, head of the Hendey Machine Co. Others elected were Frederick S. Blackall, Jr., Taft-Pierce Mfg. Co., first vice-president, and Swan E. Bergstrom, Cincinnati Milling and Grinding Machines, Inc., second vice-president.

Mr. Berna noted that the Secretary of Commerce now has power to forbid shipment of strategic list

machine tools to European nations selling strategic materials to the Russian orbit. In effect this is a red light to U. S. builders wishing to export, because every European country ships to Russia and friends, said Mr. Berna.

L. D. McDonald, chairman of the government relations committee, warned that the machine tool industry had been ignored in the steel allocation system. Mr. Ayr said that builders cannot now promise delivery under 5 or 6 months because of huge civilian order backlogs.

Shortages May Hobble Electrochemistry Boom

Steel, power, equipment, and manpower are short . . . Manpower and power scarcity may not improve . . . Electric furnace design, other technical topics discussed—*By Bill Czygan.*

Buffalo—Shortages in steel, electrical equipment and power, plus a mounting scarcity of manpower are plaguing the electrochemical industry. This was brought out in the undercurrent of talk at the 98th meeting of The Electrochemical Society, held here last week. Expanding defense needs are accelerating the upward trend of business, but shortages threaten to become a heavy millstone.

The dearth of skilled technicians is one of the biggest problems currently confronting the industry. Military drain on manpower, together with retirements, have left gaps in the ranks of electrochemists, and fewer new graduates are available to fill them. This is partly due to the popularizing of atomic energy in the general press. As demand for nuclear physics courses rises, universities have reduced the scope of electrochemistry and other curricula. Again, the industry is compelled to draw men from other science professions and train them in electrochemical techniques.

Technical Pow-Wow

Highlighting the technical program at the annual fall meeting were symposia on corrosion, electrodeposition, batteries, and electro-organic chemistry. In addition, the Electrothermic Div. held a round-table discussion on electric furnace design and operation.

Since electrical power is short now and seen as tighter in the future, considerable interest centered on developing furnaces with higher power factors and efficiencies. The need was also seen for producing better ferro-alloys at lower cost, and expending fewer kw-hr per lb in order to conserve power. Electric furnaces are also being publicized as overcoming smoke nuisance.

Interest was high in papers on cleaning metallic surfaces preparatory to electroplating. New techniques for determining surface cleanliness were presented, and advanced theory of electrodeposition was dealt with. Emphasis was on better and cheaper methods in such fields as recovery of copper, and electrolytic chromium for use as a base in high temperature alloys.

Corrosion Research

New means for the study of corrosion and their effectiveness were discussed at considerable length. Improved technology in corrosion prevention promises reduced losses from this evil. Studies on the development of cheaper production and broader usage of stainless steels are also of prime concern. New types of batteries were described, exemplifying the trend toward smaller, more compact units with greater power. Military interest in this phase is high.

Focal point of the social program was the biennial presentation of the Edward Goodrich Acheson Medal and Prize, awarded to Dr. George W. Vinal, National Bureau of Standards. The medal and $1000 prize were presented by President C. L. Faust. Extensive plant visitations were included on the social agenda, affording members a first-hand picture of the Niagara Frontier, birthplace of the Nation's vast electrochemical industry.

ELECTROCHEMISTS MEET: Left to right at the annual meeting of The Electrochemists Society are: M. J. Udy, consulting engineer, general convention chairman; Dr. C. L. Faust, of the Battelle Memorial Institute, Society president; A. T. O'Neil, president of Niagara Falls Power Co.; and H. B. Linford, Columbia University professor and Society secretary.

ICC Defines Structural Steel

Washington—Structural steel may be defined as structural steel only when it is used for that purpose, decided the Interstate Commerce Commission. When the Carroll Trucking Co. claimed that it was authorized to haul channels made of structural steel but used for automotive frames under a permit to transport structural steel, the ICC ruled otherwise.

RURAL STUDY: A typical street in Seven Islands. Population is expected to increase tenfold in the next few years with development of ore mines.

Launch Construction on Huge Q-L Ore Project

Financial arrangements for Iron Ore Co. of Canada near completion . . . Construction project is one of biggest in history of North American mining—*By Tom C. Campbell.*

Seven Islands, Quebec—About 2½ years ago the 500 French Canadians in this quaint little town went about trimming the wicks in their coal oil lamps. The 600 Nascaupee Indians on the reservation here swapped stories about fishing and wood-cutting.

Town Buzzes With Gossip

About 360 miles to the north word was leaking out of a tremendous iron ore discovery but nobody here was much excited at that time. Even Bob Ross, the local Indian trader who had seen everything, went about his work serene and unruffled.

Now everything is changed. Daily gossip sessions are held in Mayor J. Raoul Vigneault's office about big things coming to Seven Islands. Bob Ross is finally excited. Jack Layden, who runs the local movie "palace," after working hours, dreams of first run pictures —daytime he is jack-of-all-trades for Labrador Mining and Exploration.

The news is out. One of the biggest mining construction projects in North American history has begun. This place is being overrun with engineers and construction men associated with the firms which will build a 360-mile railroad northward to the Iron Ore Co. of Canada ore deposits. Also to be built are mammoth docks here which will speed high grade iron ore to the United States within the next 4 or 5 years.

Imagine if you can a small sleepy village of 500 French Canadians starting to grow overnight, and at the height of construction during the next year and a half, reaching almost 10,000 inhabitants, and then coming to rest with 5000 people. That is what is causing all the excitement here.

Contractors who will build the railroad and the docks—to cost around $200 million—are Cartier Construction Co., Ltd., Montreal, McNamara Construction Co., Ltd., Toronto, Fred Mannix & Co., Ltd., Calgary, and Morrison-Knudsen Co. of Canada.

Construction Details

It is expected that more than 2000 workers will flood this town soon when grading work gets under way. Later 500 more will be added for railroad track work. Still later about 1000 more will be working on power development. The townsite, 360 miles north of here, and the docks to be located here will take another 1000 workers. Local people are flabbergasted when they realize that by 1953 between 6000 and 7000 workers will be coming and going through Seven Islands.

This tremendous project will probably change the face of this town whose people for years have fished in the summer and cut pulp wood in the winter. Many workers on this project will probably become permanent employees of the Iron Ore Co. of Canada when actual mining begins in 1955 or before. Then more than 1000 regular employees will be employed on the railroad and at the docks. In the summer months about 1900 will be employed at the open pit mines 360 miles north of here. The townsite for the mining operations will be close to Knob Lake where approximately 2500 people will live in the summer and about 1000 in the winter.

360-Mile Railroad

The Quebec North Shore & Labrador R.R. will run 360 miles; will have from 2000 to 3000 ore cars and about 60—1600 hp diesel electric units. About 100,000 tons of rails from Canadian steel mills will be used. About 22 bridges will be built, and if a decision is made not to dig five tunnels an extra large and substantial bridge will replace the tunnels.

A temporary dock here is about half completed; shovels, trucks, bulldozers and grading machinery were being unloaded last week.

Financial arrangements for the Iron Ore Co. of Canada are about completed. Participants in the new company in varying degrees are: Armco Steel Corp., Hanna Coal & Ore Corp., Hollinger Consolidated Gold Mines Ltd., Labrador Mining & Exploration Co., Republic Steel Corp., National Steel Corp., Youngstown Sheet & Tube Co., Wheeling Steel Corp., Hollinger North Shore Exploration Co., Ltd.

Past stories on this iron ore development may be found in THE IRON AGE, Nov. 4, 1948, p. 155; Aug. 31, 1950, p. 71, Oct. 5, 1950, p. 110.

Iron Age's Campbell Sees Priority Flop Followed by CMP

Atlantic City—Collapse of the Administration's "loosely-written" and impractical steel priority system within the next several months will be followed by institution of a modified controlled materials plan—"after steel market confusion reaches a climax and November elections are held," said Tom C. Campbell, editor of THE IRON AGE, at the fortieth annual meeting of the National Assn. of Metal Distributors here.

"No Clear Cut Plans"

Departmental squabbles on allocation powers, withdrawal of some authority from the National Production Authority, and issuance of clarification orders on NPA Reg. 2 "foreshadow more trouble to come," said Mr. Campbell. He charged that a modified CMP plan was not installed because of political reasons. Stopgap measures were taken to show that something was being done before November elections.

Steel firms are voluntarily expediting defense orders, but Washington has "produced no clear cut plans for defense material," stated Mr. Campbell.

"It is predicted that close to 15 pct of total steel production in 1951 will go for war, defense, and indirect defense requirements," he said. "This percentage has been booted around by Washington officials as a smoke screen to cover the real defense program impact."

Machine Tool Exports Tightened

London — Following Winston Churchill's slam that government laxness was permitting the shipment of machine tools with war potential to Iron Curtain countries, Harold Wilson, president of the Board of Trade, told the House of Commons that Britain would require export licensing for all power-operated machine tools and examine foreign orders to virtually halt exports to Red nations.

Steel Reaches Record Payroll

New York—A record high steel industry payroll of $206,623,000 million in August helped make the total for the first 8 months of 1950 a record surpassing $1.5 billion, reported the American Iron and Steel Istitute.

August Finished Steel Shipments

As Reported to American Iron & Steel Institute

STEEL PRODUCTS		AUGUST					To Date This Year				
		Carbon	Alloy	Stainless	Total	Per cent of Total Shipments	Carbon	Alloy	Stainless	Total	Per cent of Total Shipments
Ingots	1A	81,585	8,371	1,326	91,282	1.4	* 417,186	73,581	10,816	* 501,583	1.1
Blooms, slabs, billets, tube rounds, sheet bars, etc.	1B	148,925	40,842	702	190,469	3.0	* 1,125,418	273,042	5,919	* 1,404,379	3.0
Skelp	2	11,587	-	-	11,587	0.2	75,682	-	-	75,682	0.2
Wire rods	3	78,207	1,578	83	79,868	1.3	542,477	9,621	758	552,856	1.2
Structural shapes (heavy)	4	339,921	3,127	2	343,050	5.4	2,689,178	24,026	121	2,713,327	5.8
Steel piling	5	26,503	-	-	26,503	0.4	210,316	-	-	210,316	0.5
Plates	6	437,761	15,712	941	454,414	7.2	3,330,916	104,552	7,014	3,442,482	7.4
Rails—Standard (over 60 lbs.)	7	147,240	114	-	147,354	2.3	1,174,625	246	-	1,174,871	2.5
Rails—All other	8	10,772	105	-	10,667	0.2	74,902	40	-	74,942	0.2
Joint bars	9	9,413	-	-	9,413	0.2	74,637	-	-	74,637	0.2
Tie plates	10	35,528	-	-	35,528	0.6	287,741	-	-	287,741	0.6
Track spikes	11	12,267	-	-	12,267	0.2	93,009	-	-	93,009	0.2
Wheels (rolled & forged)	12	21,504	3	-	21,507	0.3	158,834	65	-	158,899	0.3
Axles	13	8,384	55	-	8,439	0.1	67,245	410	-	67,655	0.2
Bars—Hot rolled (incl. light shapes)	14	510,433	161,727	2,052	674,212	10.7	3,895,280	1,266,138	16,203	5,177,621	11.1
Bars—Reinforcing	15	169,014	260	-	169,274	2.7	* 1,059,217	260	-	* 1,059,477	2.3
Bars—Cold finished	16	128,411	24,514	2,956	155,881	2.5	868,216	158,027	17,271	1,040,514	2.2
Bars—Tool Steel	17	1,695	6,510	-	8,205	0.1	10,373	41,557	-	51,930	0.1
Standard pipe	18	227,593	28	1	227,622	3.6	1,679,954	121	9	1,680,084	3.6
Oil country goods	19	133,376	19,763	-	153,139	2.4	962,711	146,904	-	1,109,615	2.4
Line pipe	20	325,616	-	-	325,616	5.1	2,416,998	6	-	2,417,004	5.2
Mechanical tubing	21	51,712	20,173	455	72,340	1.1	325,541	131,299	2,063	458,903	1.0
Pressure tubing	22	19,824	1,801	628	22,253	0.4	136,008	16,314	4,782	157,104	0.3
Wire—Drawn	23	259,924	4,030	1,403	265,357	4.2	1,798,741	25,178	12,472	1,836,391	3.9
Wire—Nails & staples	24	77,621	-	1	77,622	1.2	582,292	-	68	582,360	1.3
Wire—Barbed & twisted	25	19,826	-	-	19,826	0.3	155,334	-	-	155,334	0.3
Wire—Woven wire fence	26	42,001	-	-	42,001	0.7	322,215	-	-	322,215	0.7
Wire—Bale ties	27	10,191	-	-	10,191	0.2	50,559	-	-	50,559	0.1
Black plate	28	53,521	-	-	53,521	0.8	338,563	-	-	338,563	0.7
Tin & terne plate—hot dipped	29	191,634	-	-	191,634	3.0	1,270,899	-	-	1,270,899	2.7
Tin plate—Electrolytic	30	275,437	-	-	275,437	4.4	1,893,198	-	-	1,893,198	4.1
Sheets—Hot rolled	31	638,584	23,074	2,702	664,360	10.5	4,914,447	160,870	18,981	5,094,298	10.9
Sheets—Cold rolled	32	765,771	10,259	10,071	786,101	12.4	5,918,565	68,109	68,459	6,055,133	13.0
Sheets—Galvanized	33	195,321	1,679	-	197,000	3.1	1,516,338	19,001	-	1,535,339	3.3
Sheets—All other coated	34	23,020	-	-	23,020	0.4	153,898	-	-	153,898	0.3
Sheets—Enameling	35	21,903	-	-	21,903	0.3	170,077	-	-	170,077	0.4
Electrical sheets & strip	36	9,418	53,791	-	63,209	1.0	66,011	391,119	-	457,130	1.0
Strip—Hot rolled	37	209,409	4,187	499	214,095	3.4	1,480,572	27,212	5,400	1,483,184	3.2
Strip—Cold rolled	38	152,955	1,725	15,621	170,301	2.7	1,055,309	8,991	110,895	1,175,195	2.5
TOTAL	--	5,883,803	403,218	39,443	6,326,464	100.0	*43,330,682	2,946,691	281,231	*46,558,604	100.0

During 1949 the companies included above represented 99.4% of the total output of finished rolled steel products as reported to the American Iron and Steel Institute.

* Revised.

Steel Needs Revised Price Structure, Says Admiral Moreell

Pittsburgh — Revision of the antiquated steel price structure is needed to provide adequate profits for equipment replacement, permit expansion, and attract investors, stated Admiral Ben Moreell, Jones & Laughlin Steel Corp. president, at last week's regional technical meeting of the American Iron and Steel Institute.

He said that steel prices should be increased to align them with the general economy and charged that steel was in a sub parity position as compared with general industry in prices and profits. Under present circumstances and "the depressed price structure," steel could not compete favorably for risk capital.

Mr. Moreell blamed steel's price predicament on the bedlam of adverse propaganda that comes from bureaucrats, press, and radio whenever steel tries to adjust price and cost factors by notching up prices. He recognized that the industry had increased capacity by more than 10 pct since 1946 and that further expansion was planned. "But until the price structure of the industry is brought into line with that of the general economy, we will not be able to do fully the job required of us," he said.

War Won't Hurt British Steel

London — Britain's rearmament program will not injure the 1950 steel position and total supplies of steel will increase this year to about 17.4 million long tons—enough to meet defense needs, estimates the British Iron and Steel Federation.

While domestic production may exceed the official forecast, reduction of steel imports will permit only a slight gain in total steel supplies, said the Federation.

Norton Gives Pay Increases

Worcester, Mass. — Pay raises averaging 10¢ an hour for 500 employees have been awarded by the Norton Co.

Steel Will Meet Defense Needs, Says Republic's White

Condemns Washington faltering . . . Predicts steel needs for defense.

Atlantic City—The expanding productivity of the steel industry will be able to meet all military and essential civilian steel needs despite hamstringing effects of Washington's faltering policy of not providing "a blueprint for the future," C. M. White, Republic Steel Corp. president, told members of the American Hardware Manufacturers Assn. here last week.

Bottleneck Won't Be Steel

He predicted that defense output would take a substantial cut of hot-rolled sheet and strip capacity and that civilian shortages of some alloy steels and pipe were impending. In commenting on the growth of the steel industry, Mr. White claimed that, if an additional 10 million tons of steel capacity were now available, much of it could not be used.

"If we find ourselves in a full war program, the bottleneck will not be steel but skilled men to fabricate steel," he said. Indicating that the industry found it difficult to plan ahead without concrete information from Washington on the scope of the rearmament program, Mr. White stated that steel was going ahead with expansion. He cited the expansion scheduled for the end of 1952.

Foolish Philosophy

He continued that the "foolish economic philosophy" of union leaders and Washington bureaucrats that wages can be raised without price increases was unfounded. Governmental controls have a way of lingering after emergency periods expire and thus encroach ever-increasingly on American freedom, he said. Although during a crisis, governmental regulation is desirable, business should shoulder greater responsibility, controls be kept to a minimum and quickly terminated when not needed.

Industry Gets 5-Year Write-Offs

Washington — Five-year "write-offs" of defense plant and equipment became available to business and industry this week.

Designation by President Truman of the National Security Resources Board as the "certifying authority" for businessmen wishing to take advantage of the accelerated depreciation provisions of the new tax law means that any company engaged directly or indirectly in defense work now may apply immediately for relief to the NSRB.

NSRB will receive and screen applications and assign them to Commerce or Defense Dept. for recommendation. Upon return to NSRB they are reviewed by a board before final action by Chairman Symington. Only part of any program applied for can be certified.

The tax bill signed into law by Mr. Truman last month authorizes, among other things, the amortization of emergency facilities over a 5-year period, as was the case in World War II.

NSRB says this depreciation feature "has the effect of softening taxes for producers who normally would amortize the addition of buildings, machinery, and the like over a much longer period of time."

NSRB is now preparing regulations and forms for applicants. These are expected to be available soon for the various agencies of government concerned.

Alcoa Strike—Badly Timed

Pittsburgh — United Steelworkers (CIO) month-long strike at the new Point Comfort plant of Aluminum Co. of America couldn't have come at a worse time. Estimates are that the strike, which ended in late September, cost more than 10 million lb of ingot and pig aluminum. The plant still is not back to normal. The walkout was settled when the workers accepted Alcoa's offer of a 10¢ an hr wage increase, plus 5¢ an hr for adjustment of some classifications.

Ductile Iron Saves Manganese

Syracuse, N. Y.—Manganese, a material the United States imports, will be conserved by production of ductile iron, Dr. R. E. Savage, of International Nickel Co., told members of the Syracuse Chapter of the American Foundrymen's Society.

United States production during 1950 will be between 15,000 and 20,000 melt tons, Dr. Savage stated, pointing out that manganese is not needed to neutralize sulphur in ductile iron.

Canada Sets Steel Output Record

Toronto—Well ahead of 1949, Canadian production for the first 8 months of 1950 set a record—2,234,526 tons of steel ingots and castings as compared with 2,163,620 tons for last year. Pig iron output for the first 8 months of '50 was 1,498,036 net tons against 1,490,567 in 1949. Ferroalloy production was 114,590 net tons as compared with 157,286 tons in 1949.

August 1950 production of ingots and castings totalled 281,312 tons for a daily average of 83.3 pct of capacity, comparing with 264,190 tons at 78.2 pct of capacity last year. Pig iron output in August was 201,830 tons at a daily rate of 85.5 pct of capacity against 194,016 tons or 83.2 pct in '49.

Limit DO Orders Mills Must Accept

One fourth of alloy steel may go for defense under new NPA ruling . . . 45-day minimum lead time established . . . Set Jan.-Aug. as base period for figuring shipment percentages.

Washington—Carbon steel producers for the time being will not have to divert more than 15 pct of total production for fulfillment of DO-rated defense orders.

For alloy steels, up to 25 pct of production must be allotted for DO orders if necessary.

45-Day Lead Time

The 8-month period from January to August has been established as the base period for figuring shipment percentages on specific products to be set aside for defense orders.

This is the gist of the supplementary order (NPA M-1) issued by the National Production Authority last week to clarify its basic priority order (NPA Reg. 2) insofar as the handling of steel orders are concerned. The order provides a lead time of at least 45 days, that is, steel producers need not accept orders received less than 45 days before "the first day of the month in which shipment is requested."

The order applies to all carbon steel (including wrought iron) and alloy steels (including stainless) in the following shapes and forms: bars, cold-finished; bars, hot-rolled or forged; ingot, billets, blooms, slabs, die blocks, tube rounds, sheet and tin bar, and skelp; pipe, including threaded couplings of the type normally supplied on threaded pipe by pipe mills; plates; rail and track accessories; sheet and strip; steel castings (rough as cast); structural shapes and piling; tinplate, terne plate and tin mill blackplate; tubing; wheels, tires and axles; wire rods, wire and wire products; forgings (rough as forged).

Percentages Established

The order also provides that unless specifically ordered by NPA, no steel producer shall be required to take DO orders for shipment in any one month in excess of the following percentages (using the January-August period) of his average monthly shipments:

5 pct—Carbon and semi-finished steel, carbon and alloy sheets and strip, carbon pipe, tin mill products, rail and track accessories, carbon wire rods, wire, and wire products.

10 pct—carbon hot-rolled bars, carbon cold-finished bars, carbon tubing.

15 pct—carbon and alloy plates, carbon and alloy structural shapes and piling, alloy cold-finished bars.

25 pct—alloy semi-finished steel and hot rolled bars, alloy tubing, alloy wire rods and wire.

If defense orders to individual producers in any one month exceed the foregoing percentages, he need not accept surplus orders. It would then be up to the government to find a producer who could fulfill them.

In releasing the order, NPA Administrator Harrison said that the percentages thus set are seen as providing steel for defense needs in the foreseeable future. However, he said, they would be subject to revision upward if need requires.

August Iron & Steel Production by Districts

As Reported to American Iron & Steel Institute

BLAST FURNACE CAPACITY AND PRODUCTION —NET TONS	Number of Companies	Annual Blast Furnace Capacity July 1, 1950	PRODUCTION							
			PIG IRON		FERRO-MANGANESE AND SPIEGEL		TOTAL			
									Pct of Capacity	
			Current Month	Year to Date	Current Month	Year to Date	Current Month	Year to Date	Current Month	Year to Date
Distribution by Districts:										
Eastern	12	13,353,580	1,141,201	8,199,691	23,792	212,864	1,164,993	8,412,555	102.7	94.6
Pitts.-Youngstn.	16	26,735,520	2,169,663	15,822,134	17,475	156,037	2,187,138	15,978,171	96.3	89.7
Cleve.-Detroit	6	7,044,600	573,037	4,521,156			573,037	4,521,156	95.7	96.4
Chicago	7	15,897,190	1,145,265	8,883,258			1,145,265	8,883,258	84.8	83.9
Southern	9	5,215,640	458,984	3,263,626	4,519	63,088	463,503	3,326,714	104.5	96.8
Western	4	3,375,200	236,427	1,660,893			236,427	1,660,893	82.4	74.7
Total	37	71,621,730	5,724,577	42,350,758	45,786	431,989	5,770,363	42,782,747	94.8	89.8

STEEL CAPACITY AND PRODUCTION —NET TONS	Number of Companies	Annual Steel Capacity July 1, 1950	PRODUCTION							
			TOTAL STEEL				Alloy Steel* (Incl. under total steel)		Carbon Ingots-Hot Topped (Incl. under total steel)	
					Pct of Capacity					
			Current Month	Year to Date	Current Month	Year to Date	Current Month	Year to Date	Current Month	Year to Date
Distribution by Districts:										
Eastern	24	20,387,460	1,605,504	12,222,671	92.7	91.7	114,635	808,540	275,289	2,201,226
Pitts.-Youngstn.	33	39,127,940	3,286,849	24,730,903	98.9	94.9	420,153	3,114,039	360,371	2,618,228
Cleve.-Detroit	8	9,333,460	756,987	6,109,896	95.5	98.3	49,455	358,526	96,794	816,332
Chicago	15	21,351,700	1,699,315	13,720,997	93.7	98.5	123,705	1,029,583	238,701	1,903,825
Southern	8	4,588,320	403,610	3,148,485	103.6	103.5	4,163	35,190	3,656	39,976
Western	11	5,774,620	478,052	3,475,387	97.4	91.3	4,143	60,615	12,486	83,098
Total	78	100,563,500	8,230,317	63,408,339	96.3	95.5	716,254	5,406,493	987,297	7,642,685

* For the purpose of this report, alloy steel includes stainless and any other steel containing one or more of the following elements in the designated amounts: Manganese in excess of 1.65%, and Silicon in excess of 0.60%, and Copper in excess of 0.60%. It also includes steel containing the following elements in any amount specified or known to have been added to obtain a desired alloying effect: Aluminum, Chromium, Cobalt, Columbium, Molybdenum, Nickel, Titanium, Tungsten, Vanadium, Zirconium, and other alloying elements.

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Load energy 50% cycle	.140	.200
Water	.010	.032
Amortization 20,000 hrs	.244	.354
Total cost	$0.484	$0.730

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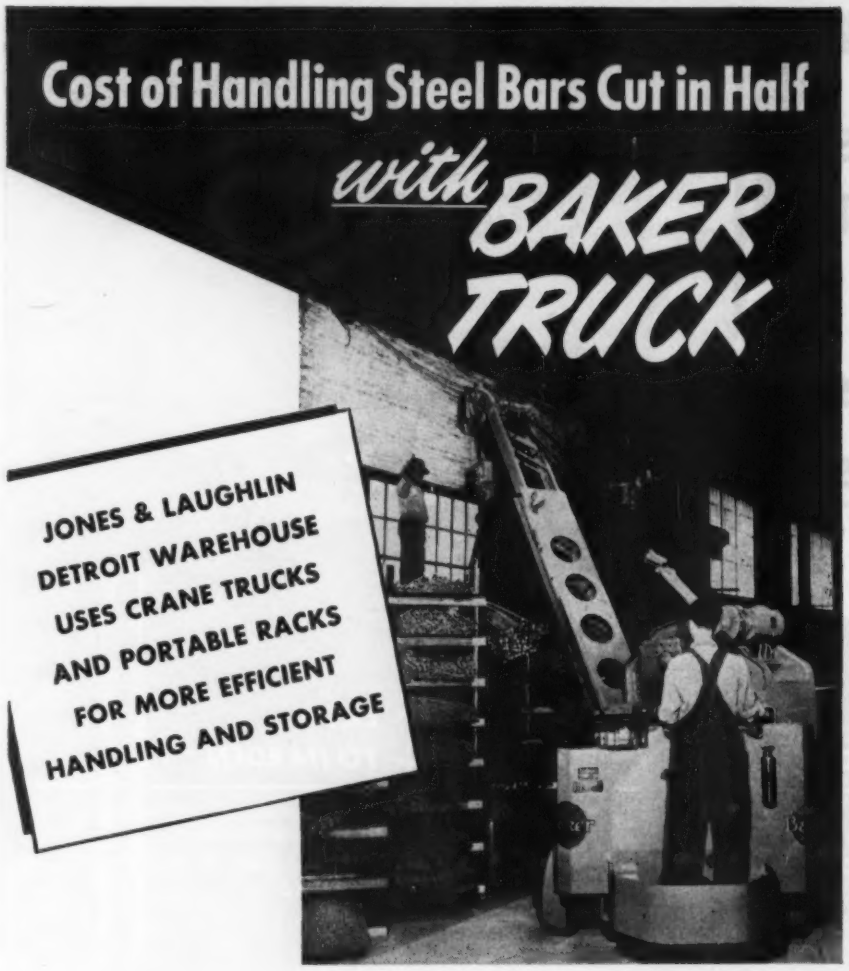

★ Specially designed portable sectional racks for storing steel bar and rod stock plus the use of a BAKER Crane Truck have cut handling costs by one-half at the Jones & Laughlin Steel Corporation's Detroit Warehouse. This stock was formerly stored by hand in upright position, requiring laborious manual handling. Even with overhead cranes, considerable hand labor was necessary. Previous to the purchase of the truck and the installation of the portable racks, Jones & Laughlin used 6, 8, or more men to pile steel and fill orders. The entire operation is now handled by three men.

With the BAKER Crane Truck and sectional storage racks, costs have been halved—and the crane truck still has time to handle steel packs—a further saving not anticipated when it was purchased.

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GE Dedicates New Lab Home; Langmuir Receives Carty Medal

Schenectady — Fifty years of fundamental technological research were celebrated with the dedication of General Electric's fabulous new research center, The Knolls Laboratory, and the award of honors to GE scientists in ceremonies held here this week. Scientists from home and abroad, here for the annual meeting of the National Academy of Sciences, attended the ceremonies.

Speaking in the presence of Dr. Willis Whitney, founder, and Dr. William Coolidge, first director of the laboratory, Charles E. Wilson, president, paid homage to the men and to the attitude of "positive optimism" which has made possible advances in electronic and atomic research.

Dr. Irving Langmuir, first American winner of the Nobel Prize and holder of the Faraday Medal of the British Institute of Electrical Engineers, was awarded the biannual Carty medal for noteworthy contributions to fundamental research.

U. S. Steel-USW to Resume Talks

Pittsburgh—U. S. Steel Corp.-United Steelworkers (CIO) discussion of new contract demands by the union, including a demand for an unspecified wage increase, will be resumed here at 10 A. M. Friday, Oct. 27.

At a 3-hr session Oct. 16, Philip Murray, union president, presented the union's demands. After the meeting, both Murray and John Stephens, U. S. Steel vice-president, agreed that the union mentioned no specific wage figure. The company made no counter - proposals. Presumably this will be done on Oct. 27.

Buys Connors Steel Co.

Birmingham—H. K. Porter Co., Inc., Pittsburgh, has acquired the Connors Steel Co., of this city, producers of electric furnace steel and steel products, reports T. M. Evans, Porter president.

'Tain't So, Mr. Pearson

Washington—By writing that steel scrap prices had skyrocketed after the Korean outbreak, Drew Pearson, columnist, has dealt the scrap industry a "blow below the belt," said Walter S. J. Swanson, of the Institute of Scrap Iron & Steel Inc.

In refuting the columnist's alleged statement, Mr. Swanson said, "THE IRON AGE magazine is an authoritative source of data on iron and steel scrap prices. It gave the price of No. 1 heavy melting steel scrap at Pittsburgh as $38.75 a ton on May 23. On June 20, a few days before the war was known about, the price was $44.75 and on Oct. 3 it was $43.75—an actual drop from pre-Korea cost. This is the price of the bellwether grade of steel scrap."

Car Builders Won't Reach 10,000 Cars a Month Till January

Washington—Even with the aid of priority ratings and allocations, it will be at least January before enough steel can be made available to enable freight car builders to produce the planned 10,000 cars a month.

This was a conclusion reached last week at a meeting between representatives of the National Production Authority, the Defense Transport Administration (claimant agency), the railroads, and the freight car builders.

To Double Rate

Car building's steel consumption rate for the first half of 1950 was about 1,500,000 tons. On the 10,000-car-a-month basis, the steel supply rate would be more than doubled—that is, stepped up to between 3 million and 4 million tons. This would also take care of maintenance and repairs.

This is the major reason why, in assigning percentages for steel set-asides for DO-rated orders, percentages for bars and plates were placed at 15 and 25 pct in comparison with 5 and 10 pct for other types of steel.

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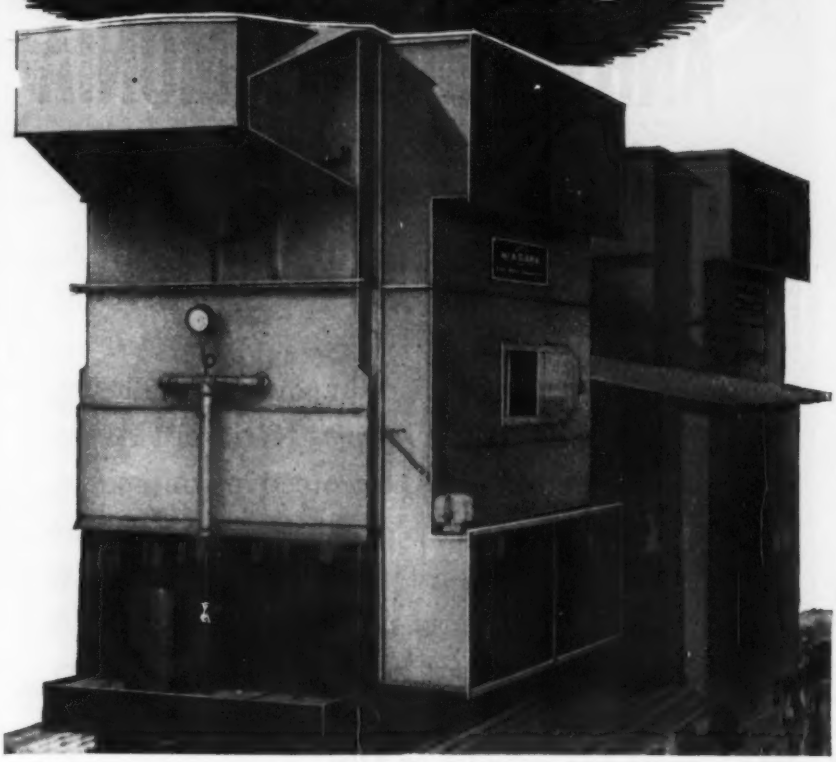

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Armco Reveals $35 Million Expansion at Openhearth Opening

Middletown, Ohio—Armco Steel Corp.'s expansion to bring its steel capacity to 4,810,000 tons by the end of 1952 was disclosed this week with an announcement that a $35 million project will be started. Armco will build a blast furnace and coke ovens, enlarge its soaking pits and otherwise improve its East Works plant.

The expansion report came shortly before Armco opened production of its new $12 million openhearth plant at Middletown last Monday afternoon. Many steel men were in throngs attending dedication rites to witness a new method of charging furnaces by a system of hydraulic hoists which elevate scrap-filled cars or buggies. The plant has a capacity exceeding 400,000 tons of steel ingots annually.

Building Electric Furnace

Charles R. Hook, chairman of the board, also reported that the Sheffield Steel Corp., a subsidiary, is constructing a large electric furnace at Houston, Tex. Sheffield will build either an openhearth or electric furnace at its Kansas City plant soon.

Stating that Armco's capacity will increase 27 pct from the July 1950 capacity of 3,793,000 tons, Mr. Hook continued, "Principal places where capacity increases will be made are 580,000 tons at Middletown; 150,000 tons at Houston; 150,000 tons at Kansas City; and 137,000 tons at Ashland, Ky."

The planned blast furnace will be able to produce 1500 tons of pig iron per day. It will be served by a new ore storage yard and car dumper able to hold 1 million ore tons. By-products coke ovens will number 75. A chemical recovery by-products plant will also be built.

Sells Italy Mill Equipment

Pittsburgh—A $650,000 order for steel rolling mill equipment for Terni, Rome, Italy steel combine, was announced by Lewis Foundry & Machine Div. of Blaw-Knox Co.

STEEL CONSTRUCTION NEWS

Fabricated steel awards this week included the following:

650 **Tons,** 3 highway bridges, Pennsylvania Dept. of Highways, Schuylkill County, Pa., to American Bridge Co., Pittsburgh.

480 **Tons,** warehouse, crane runway, other buildings for Gulf Oil Co., Philadelphia, Henry E. Baton, Philadelphia, low bidder.

440 **Tons,** Disturbed Patients' Bldg., Hollidaysburg State Hospital, Hollidaysburg, Pa., McCloskey & Co., low bidder.

375 **Tons,** Tanks at Charlotte and Greensboro, N. C., and Spartanburg, S. C., for Atlantic Refining Co., to Chicago Bridge & Iron Co.

290 **Tons,** Omaha, mill buildings, to Gate City Iron Works, Omaha.

250 **Tons,** Chattanooga, Tenn., mill building for Quaker Oats Co., to Jos. T. Ryerson and Son.

180 **Tons,** Addition to Princeton Hospital, Princeton, N. J., Mathews Construction Co., Princeton, general contractors.

175 **Tons,** Hitchcock City, Nebr., bridge F 506/1/, to Omaha Steel Works, Omaha.

160 **Tons,** Washington City, Wis., bridge project FG-03-1-/25/ to Northeastern Boiler and Welding Co., Green Bay, Wis.

138 **Tons,** Quincy and Weymouth, Mass., replacement of wood highway floor with new wood sidewalks on a draw span of the Fore River bridge on route 3 A. Frederick W. Byron, Dedham, low bidder.

125 **Tons,** Minneapolis, Bridge No. 6664, Minnesota State Highway, to American Bridge Co.

120 **Tons,** Milwaukee, bridge project F-03-1/22/, to Worden Allen Co., Milwaukee.

120 **Tons,** Darien, Conn., reinforced concrete pavement and single span rolled beam bridge. Brunale Construction Co., Southington, Conn., low bidder.

110 **Tons,** Bell Telephone Co. building, Gloucester, N. J., Thomas Pagan Construction Co., Camden, N. J., general contractors.

Fabricated steel inquiries this week included the following:

7500 **Tons,** New Jersey Turnpike Commission Contract 45, bridge substructure (Contract 45 A) and bridge superstructure (Contract 45 B) at Newark, N. J., bids due Oct. 31.

1157 **Tons,** Providence, Olneyville Square, construction of final section of Olneyville Expressway from Westminster St. to Harris Ave. Bridges and overpass. Charles A. Maguire and Associates, consulting engineers. Completion date of the Expressway, Oct. 31, 1952. Completion of Olneyville section, June 15, 1952.

600 **Tons,** Riverdale, N. D., Army engineers service bridge. Bids Due Oct. 31.

550 **Tons,** Trenton approach to Delaware River bridge, Trenton, N. J., bids due Nov. 9.

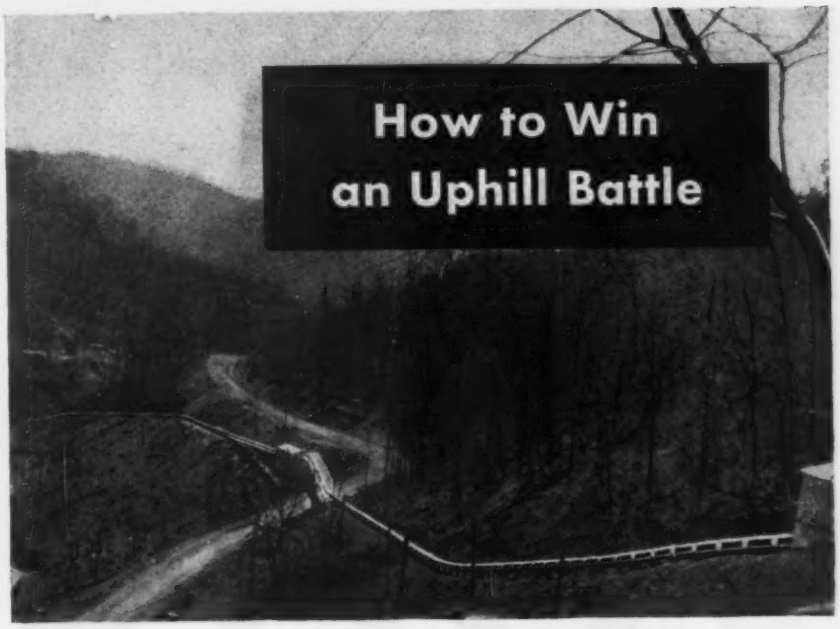
431 **Tons,** Harrisburg, Pa. Construction of precast girder bridge. Secretary of Highways, Harrisburg, Pa. Bids due Oct. 27, 1950.

430 **Tons,** Pennsylvania Dept. of Highways, highway bridge, Delaware County, Pa., bids due Oct. 27.

400 **Tons,** Agricultural Building, University of Delaware, Newark, Del., bids due Oct. 31.

380 **Tons,** Pennsylvania Dept. of High-

Turn to Page 102



Put the Bulk Materials Handling Problem Up to Hewitt-Robins

That serpentine structure up there, winding its way up a Kentucky mountainside, is a Hewitt-Robins Belt Conveyor System.

From loading point to discharge point, it stretches half a mile—tunneling under some roadways, bridging others, jumping ravines, to lift its load almost 500 feet. It carries up to 300 tons an hour, makes the climb in about six minutes . . . and does it *more efficiently and economically than any other practical method.*

In every industry with materials to move, Hewitt-Robins Belt Conveyors are helping to win today's uphill battle against ever-increasing costs. In plants, mines and quarries —at tracksides and docks—above ground and below—they are moving bulk materials of every conceivable kind efficiently and dependably, at low operating and maintenance costs.

Your own materials handling problem may be a simple one with a simple answer such as the new Hewitt-Robins Sectional Conveyor —a packaged unit your own workmen can assemble. Or it may be complex and require a specially engineered multi-unit conveyor system. In any case, we believe we can save you time, trouble and money in materials handling because we alone are equipped to provide the *complete* answer—to accept sole responsibility for the design, manufacture and installation of the entire system . . . *belting and machinery.* A world-wide experience of over half a century is at your disposal. Put your Bulk Materials handling problem up to Hewitt-Robins. Write Robins Conveyors Division, Passaic, N. J.

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BELT CONVEYORS (*belting and machinery*) • BELT AND BUCKET ELEVATORS • CAR SHAKEOUTS
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TRANSMISSION BELTING • VIBRATING CONVEYORS, FEEDERS AND SCREENS

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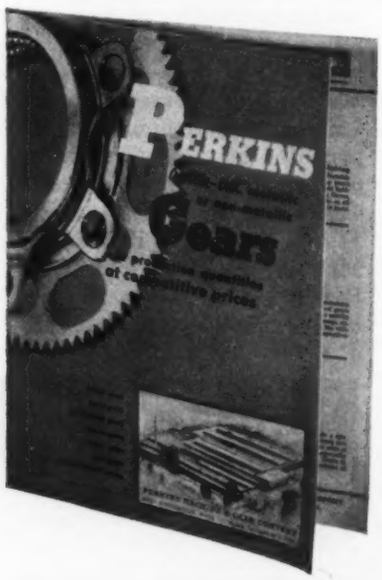
Have PERKINS Gear Engineers review your specifications and prints towards obtaining maximum efficiency in power transmission with a minimum of maintenance — all of which ultimately adds up to lower costs. Send samples or prints and specifications for prompt quotations.



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IN ALL MATERIALS, METALLIC & NON-METALLIC

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Steel Construction News

Continued

ways, highway bridge, Cumberland County, Pa., bids due Nov. 10.
300 **Tons,** Minnesota, bridge 6676.
200 **Tons,** Addition to plant, E. I. du Pont de Nemours Co., Carneys Point, Salem County, N. J., bids due Oct. 18.
120 **Tons,** Jefferson County, Nebr., bridge F-459/2/.

Reinforcing bar awards this week included the following:
2250 **Tons,** Tullahoma, Tenn., engine testing building, U.S. Air Force, to Ceco Steel Products Co., Birmingham, Ala.

Reinforcing bar inquiries this week included the following:
679 **Tons,** Providence, Olneyville Square, construction of final section of Olneyville Expressway from Westminster St. to Harris Ave. Bridges and overpass.
187 **Tons,** Harrisburg, Pa. Construction of precast girder bridge. Secretary of Highways, Harrisburg, Pa. Bids due Oct. 27, 1950.

Work to Start on Atom Plant

Idaho Falls, Idaho—Work on remaining buildings and other facilities where the first atomic power plant for ship propulsion will be assembled and tested will get underway soon.

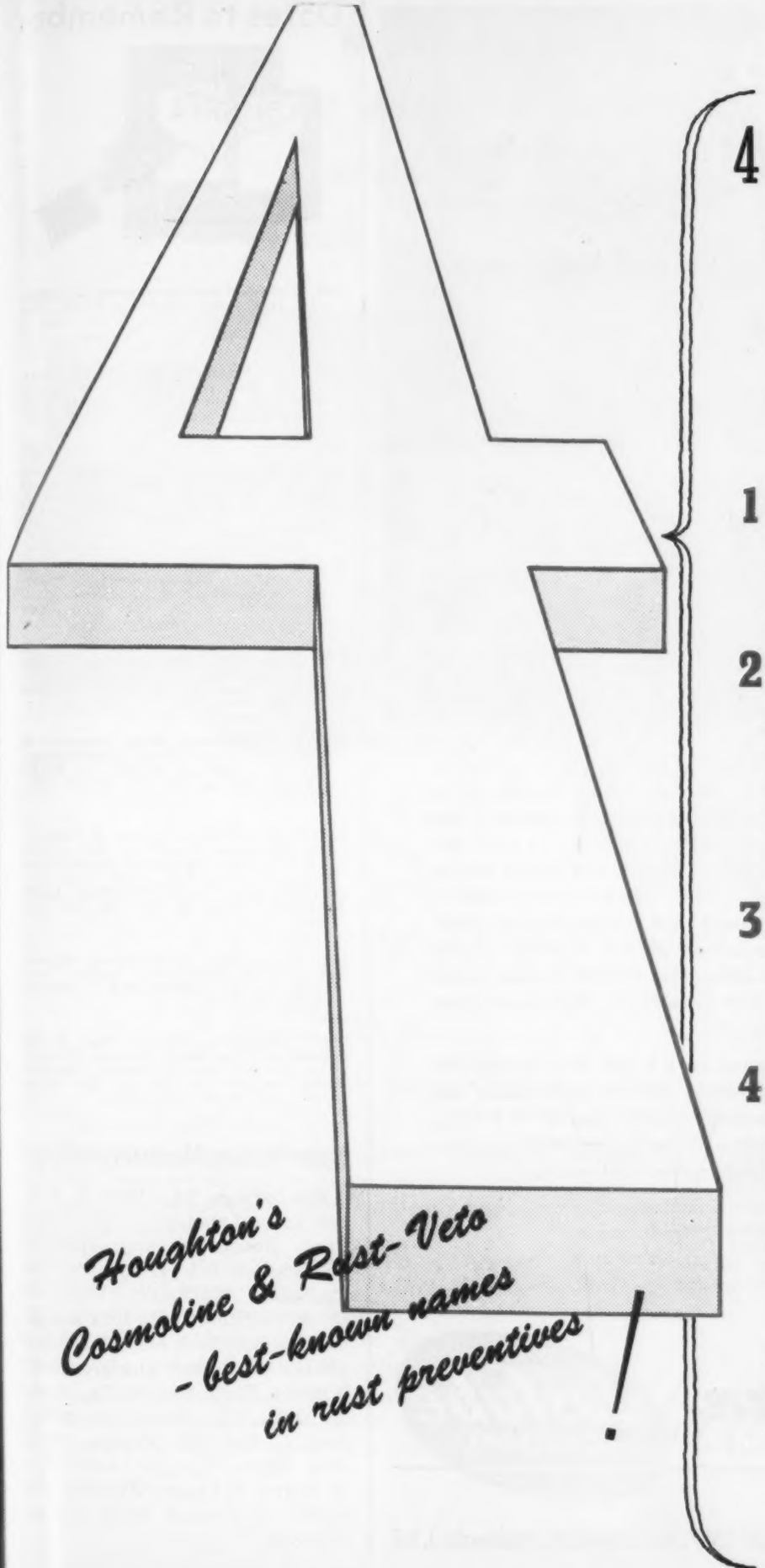
Westinghouse Electric Corp. and the Atomic Energy Commission announced that the three apparent low bidders for the job are M. J. Brock & Sons, Inc., Los Angeles, $1,018,000; Nomellini Construction Co., Stockton, Calif., $1,025,000, and F. H. McGraw & Co., Hartford, Conn., $1,085,151. Work will begin ten days after the successful bidder is announced.

The "naval reactor" test plant is to be erected at the AEC's Reactor Testing Station near Arco, Idaho.

Construction of the main building at the test site already is underway. F. H. McGraw & Co. was successful bidder on this job with a bid of $1,247,000.

Keystone Builds Openhearth

Peoria, Ill.—Keystone Steel and Wire Co. early this week began construction of a new $1.5 million openhearth furnace at its South Bartonville Works to increase steelmaking capacity by about 100,000 tons annually. The additional capacity will boost the plant's capacity to more than 425,000 tons annually. Company officials say that when the furnace is completed expansion in rolling mill and soaking pit capacity will be necessary.



4 items to consider before you buy rust preventives:

1 New government specifications are now being issued, reducing the number of varieties and combining Army, Navy and Air Force standards. There will be new Houghton products to meet those "specs".

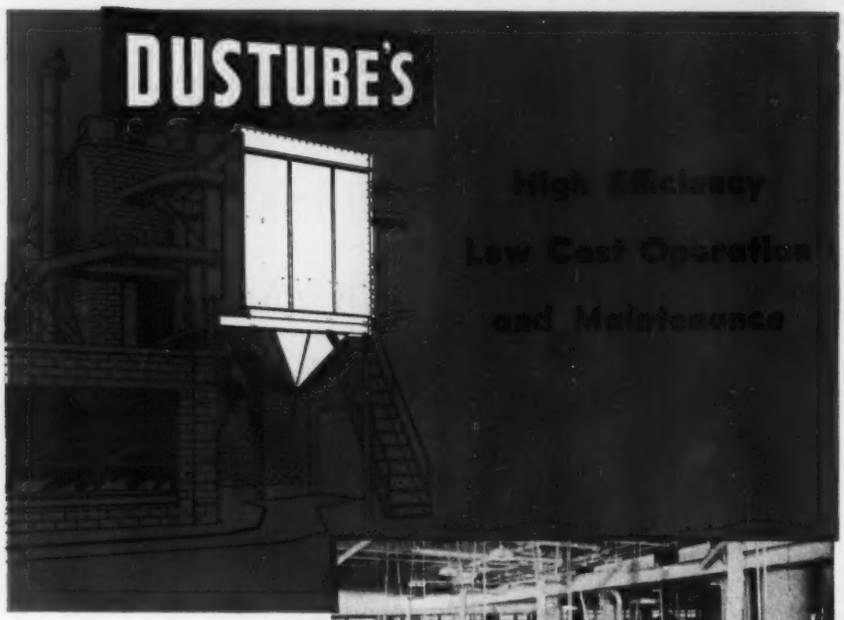
2 Meanwhile the contracts you now have and those you obtain for metal products in the near future will specify the use of corrosion preventives identified by "spec" numbers which have been in effect since World War II. Houghton has time-tested approved products in its *Cosmoline* line which meet most of those former standards.

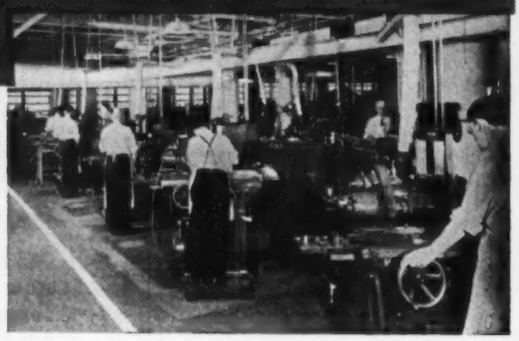
3 Houghton has just prepared a handy chart listing current specifications still in force. This is a single sheet with filing tab, showing the Houghton product brand meeting each type. *Write for a copy.*

4 Houghton, identified closely with rust prevention since 1867, also supplies a complete line of *Rust Veto* products for industrial use where no "spec" is listed. These also have stood the test of time, through 3 wars and industry's peace-time demands. The "All-Star Line-Up" folder lists the leaders in this series; write for it, also.

If metal corrosion is a serious problem, depend on Houghton to help you solve it. E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa. Service and sales in most principal cities.

Houghton's Cosmoline & Rust-Veto - best-known names in rust preventives!





. . . are demonstrated by installation at EASTMAN KODAK CO.

The problem of ventilating 61 grinding wheels, used in processing tools, dies, jigs and fixtures, was solved at Eastman Kodak Co. by installing Dustube Collectors. These high-efficiency collectors trap the finest dust particles with no visible discharge . . . rated efficiency is close to 100%. Maintenance is kept to a minimum because the tubes are never under tension; never in contact with abrading or corrosive metal. When infrequent tube replacements are necessary, one man can change them in mere seconds. Inspection is fast and simple from the clean air side. The Dustube reduces power costs because resistance to air flow is much less than in any other cloth type collector of equal capacity.

Thousands of plants, like Eastman, have found that Dustube collectors pay off in increased efficiency, low-cost maintenance and operation. They are supplied in standard sizes from 270 C.F.M. up and in specially engineered systems. Write for literature or a complete analysis of your dust problem, without obligation.

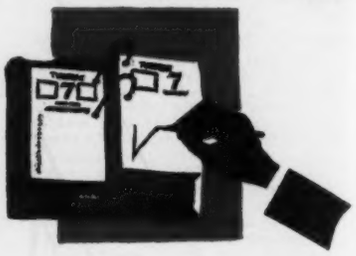
Write for this free 54-page illustrated catalog on Dustube Dust Collectors. It contains valuable engineering data. Ask for Catalog 72-A.

American dustube COLLECTORS

OFFICES IN PRINCIPAL CITIES

AMERICAN WHEELABRATOR & EQUIPMENT CORP., 510 S. Byrkit St., Mishawaka 3, Ind.

Dates to Remember



Oct. 18-19—National Conference on Industrial Hydraulics, Sherman Hotel, Chicago. Conference director is Otto J. Maha, Hannifin Corp., Chicago.

Oct. 18-20—Society of the Plastics Industry, annual conference, New Ocean House, Swampscott, Mass. Society headquarters are 295 Madison Ave., New York.

Oct. 23-25—American Gear Manufacturers Assn., semiannual meeting, Edgewater Beach Hotel, Chicago. Association headquarters are in the Empire Bldg., Pittsburgh.

Oct. 23-26—American Institute of Steel Construction, annual meeting, Shamrock Hotel, Houston. Institute headquarters are at 101 Park Ave., New York.

Oct. 23-26—Wire Assn., annual meeting. Lord Baltimore Hotel, Baltimore. Association headquarters are at 300 Main St., Stamford, Conn.

Oct. 23-27—National Metal Congress & Exposition, International Amphitheater, Chicago. American Society for Metals headquarters are at 7301 Euclid Ave., Cleveland.

Oct. 24-25—American Society of Mechanical Engineers, Fuels Div. and American Institute of Mining & Metallurgical Engineers, Coal Div., joint fuels conference, Hotel Statler, Cleveland. ASME headquarters are at 29 W. 39th St., New York.

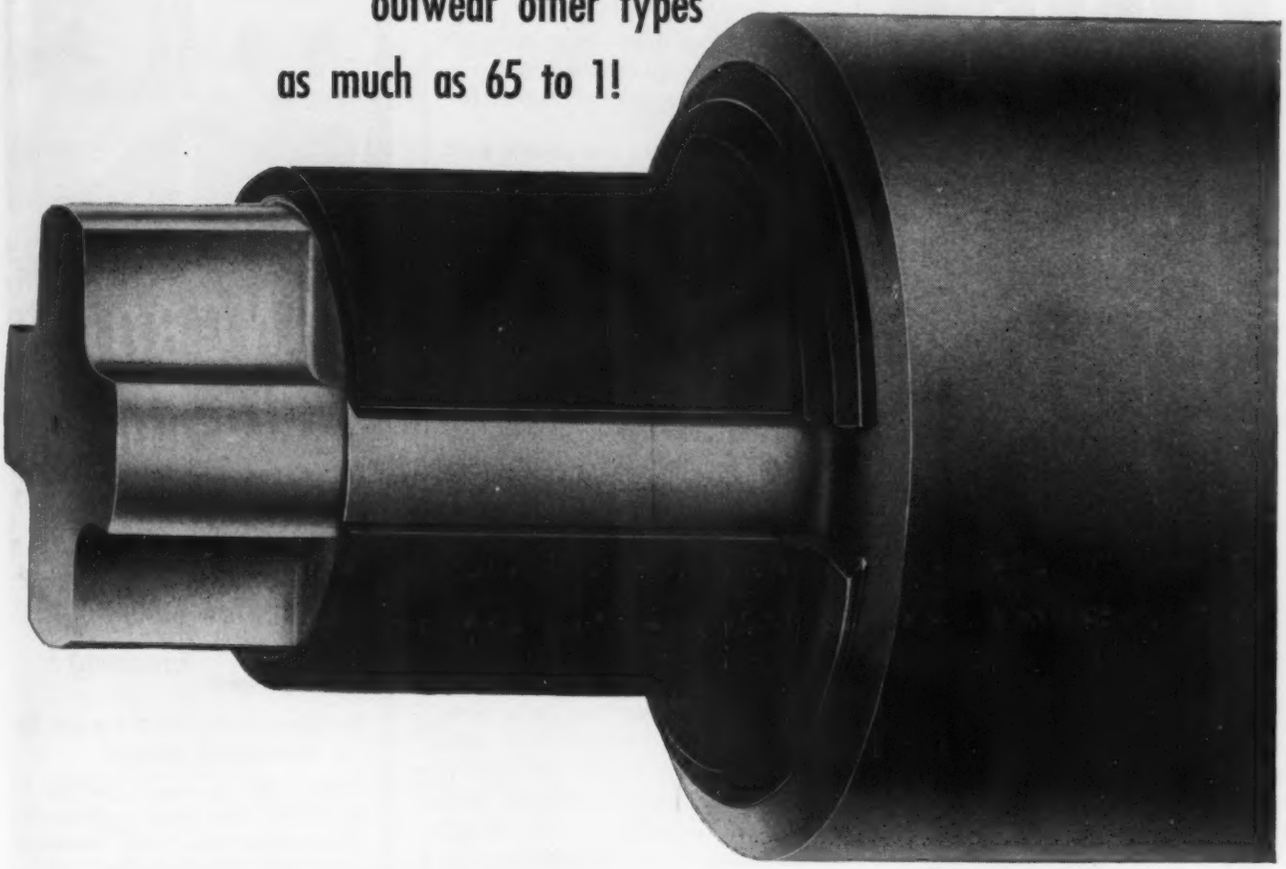
Oct. 26-28—Audio Engineering Society, audio fair, Hotel New Yorker, New York. Society's address is P. O. Box F, Oceanside, N. Y.

Oct. 29-Nov. 1—National Tool & Die Manufacturers Assn., Annual Convention, Hotel Statler, Cleveland. Association headquarters are in the Union Commerce Bldg., Cleveland.

Name Package Machinery Officers

Hot Springs, Va.—Boyd H. Redner, general manager of the Battle Creek Bread Wrapping Machine Co., was elected president of the Packaging Machinery Manufacturers Institute at its 18th annual meeting held here recently. Other officers are: First vice-president, Wilhelm B. Bronander, Jr., Scandia Mfg. Co.; second vice-president, G. Radcliffe Stevens, president, Elgin Mfg. Co. Andrew J. B. Adams, S. Chester Markley and Edwin H. Schmitz were elected directors.

Westinghouse Micarta Bearings made with **Alcoa Alumina** outwear other types as much as 65 to 1!



Look at the comparative life of these steel roll neck bearings in a high-speed, high-pressure strip-steel finishing mill:

Metal Bearings	1,000 tons strip steel rolled per bearing
Fiber-Filled Bearings	10,000 " " " " " "
Micarta Bearings Impregnated with Alcoa Alumina	65,000 " " " " " "

(Data by courtesy of Westinghouse Electric Corporation)

Used as a filler, ALCOA Alumina adds both strength and wear resistance to plastics. It also increases their resistance to acid and alkali, helps maintain a highly polished roll neck.

Whether it is for machined plastics like these Micarta bearings, molded shapes or thin films, ALCOA Alumina decreases porosity and increases elasticity. Appreciable amounts may be incorporated without impairing the clarity of the product or purity of its color.

Among the grades of ALCOA Calcined Aluminas and Hydrated Aluminas, manufacturers of plastics and other synthetics find fillers meeting practically every requirement. If you make or use plastic products, let us give you further information regarding the advantages of alumina fillers in *plastics, resins, varnishes and rubber*. Write to: ALUMINUM COMPANY OF AMERICA, CHEMICALS DIVISION, 621K Gulf Building, Pittsburgh 19, Pennsylvania.

Alcoa Chemicals

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ALUMINAS and FLUORIDES

ACTIVATED ALUMINAS • CALCINED ALUMINAS • HYDRATED ALUMINAS • TABULAR ALUMINAS • LOW SODA ALUMINAS ALUMINUM FLUORIDE • SODIUM FLUORIDE • SODIUM ACID FLUORIDE • FLUOBORIC ACID • CRYOLITE • GALLIUM

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LOW CARBON
HIGH CARBON
STAINLESS
SPECIAL ALLOY
ARMCO IRON

ROUND
FLAT
OR
SHAPED

You draw the Shape
—Page can draw the Wire

—the way you want it for your production—whether it's ALL of your product, or only a part.

Cross-sectional areas up to .250" square; widths to ⅜"; width-to-thickness ratio not exceeding 6 to 1.

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Information about Wire—

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PAGE STEEL AND WIRE DIVISION
AMERICAN CHAIN & CABLE

FREE

PUBLICATIONS

Continued from Page 36

there are two dozen case histories of how these products have performed in a variety of industries. *Brooks Oil Co.*

For free copy insert No. 6 on postcard, p. 37.

Emblems and Pins

A few representative samples of service emblems, lapel buttons and pins, distinctively designed to boost morale and foster good labor and public relations, are shown on a new leaflet. The sheet describes various combinations of designs and trademarks that have been successfully applied by a number of companies in service award programs. *American Emblem Co.*

For free copy insert No. 7 on postcard, p. 37.

Ventilators

Sargent Hinge v Head ventilators, offering lower maintenance cost and lower cost per cu ft of air removed, are described in a new 4-p. folder. The special high efficiency fan and throat design of these ventilators is discussed, and additional features are presented. Specifications and dimensions of the most popular sizes are included. *Sargent Enginairing Co.*

For free copy insert No. 8 on postcard, p. 37.

New Type Clutch

The Magneclutch, a magnetic-particle clutch which represents a new solution to problems of controlled mechanical power transmission, is detailed in a new 26-p. bulletin. The booklet presents information on operation applications and other characteristics of the equipment. Performance and dimensional data are contained, along with complete specifications. The unit combines small control power with extremely fast response, and offers large power handling capabilities, long life of torque transmitting surfaces, easy adaptation to remote control and wide range of operating speed, as shown in the booklet. *Vickers Electric Div., Vickers, Inc.*

For free copy insert No. 9 on postcard, p. 37.

Resume Your Reading on Page 37

PANGBORN
Hydro-Finish

Prolongs Die Life!
Saves Labor!
Eliminates Emery Cleaning!

**for Rockford Drop Forge Co.
Rockford, Illinois**

HYDRO-FINISH increases die life for Rockford Drop Forge by eliminating surface-disturbing emery cleaning at end of runs. Hand polishing is cut to a minimum because it's done *before* heat treating. Hydro-Finish removes all heat-treat scale, holds tolerances and leaves surface smoother than hand polishing. Estimates show Hydro-Finish will pay for itself out of savings in two to three years!

HYDRO-FINISH simplifies manufacture and maintenance of tools, dies and molds. Costly hand work is reduced and surfaces are virtually free from directional grinding lines. Hydro-Finish assures better bonding, electroplating, painting—gives you *the surface you want* within .0001"!

FOR FULL INFORMATION visit our Booth No. 2560, NATIONAL METAL CONGRESS AND EXPOSITION, Chicago, Ill. (Oct. 23-24-25-26-27), or write for Bulletin 1400A to: PANGBORN CORPORATION, 1500 Pangborn Blvd., Hagerstown, Maryland.

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JUST PUT IT on one basis . . . *dollars and cents!* If you cut down preparation time, you save money. If you cut down machine stoppages and rejects, you save still more. And you'll make *all* these savings with Roebling Cold Rolled Spring Steel because it's dimensionally accurate . . . absolutely uniform in physical properties and structure . . . one inch just like every other inch.

Roebling Cold Rolled Spring Steel is available annealed, hard rolled untempered; scaleless tempered; tempered and polished; tempered, polished and strawed, or tempered, polished and blued.

Have your Roebling Field Man help you select the cold rolled spring steel—or the round, flat or shaped wire—that will help improve both your product and your production, and give you genuine economy. John A. Roebling's Sons Company, Trenton 2, New Jersey.

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It's a Hard Worker!

Battery industrial trucks such as this husky are the wheel horses of modern material handling systems. They do their heavy work anywhere from 8 to 24 hours a day... week after week, year after year . . . with little or no complaint. That's dependability!

The surest way to get full value out of these hard-working, revenue-producing trucks is to equip them with rugged, unfailing batteries... the kind that stay on the job, out of the repair shop. Which is another way of saying, "You'll do a better job cheaper with EDISON Storage Batteries."

Edison cells were designed for hard work. They're built of steel inside and out, and their electrolyte preserves the steel. The steel-sheathed active materials can't shed. Edison batteries can't be injured by accidental short-circuiting or reverse charging... or by standing idle during shutdowns . . . or even by freezing.

Initially, Edison batteries cost a little more. But when you rate them in terms of years worked, tons handled and down-time saved, you'll agree that they're the best investment you can make. Ask any user!

Write for free booklet SB 2039. Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J. In Canada, International Equipment Company, Ltd., Montreal and Toronto.

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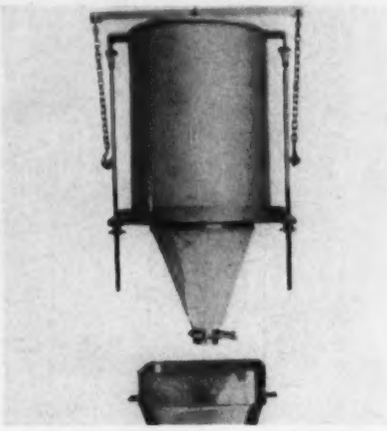
STORAGE BATTERIES

NEW

PRODUCTION IDEAS

Continued from Page 40

into position. The complete assembly is then rotated on pivot bolts located at the center of gravity. A



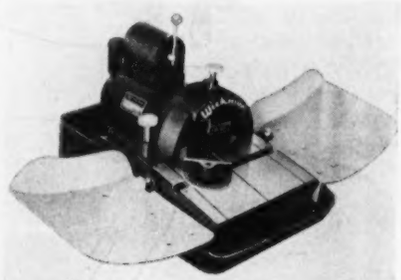
canvas sleeve unfolds from the inverted top support and receives the material that flows from the inverted drum. Drums 16 to 24½ in. diam by 24 to 36 in. high can be accommodated. *F. J. Stokes Machine Co.*

For more data insert No. 23 on postcard, p. 37.

Grinding-Lapping Machine

Permits use of silicon carbide abrasive wheels and diamond wheels.

A new model bench grinder incorporates basic features of the GF-2 grinder, including a 1-hp reversible motor, 12 gph impeller



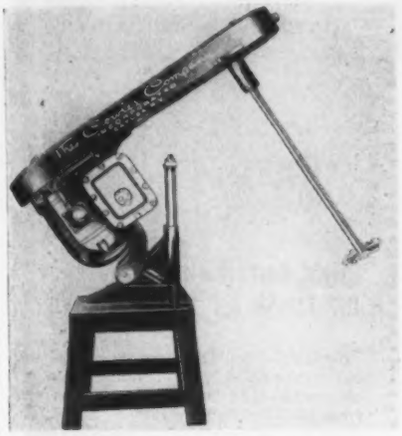
type coolant pump, and swivelling wheel guard. A second wheel guard for use with ordinary abrasive wheels, three-position table to provide for wheel wear, a milled protractor slot, and a new coolant filter are added features of the improved machine. *Wickman Mfg. Co.*

For more data insert No. 24 on postcard, p. 37.

Dissolver

Rugged, compact, flexible machine works batches of 5 to 100 gal.

The entire motor, bridge, and dissolver unit may be adjusted in height through a range of 11 in. by means of an elevating screw, making the unit adaptable to containers of varying depths. The bridge support tilts through an angle of 60° for quick removal of



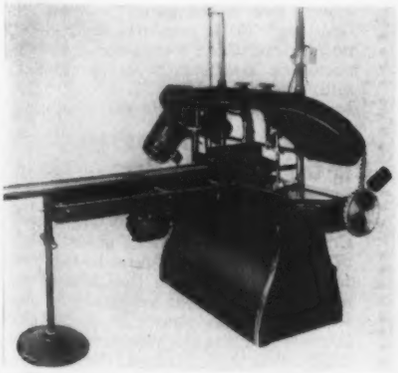
the impeller from tanks. Drive assembly is mounted on a slide plate to permit horizontal movement, affording a wide selection of sheave ratios and speeds. *Cowles Co., Inc.*

For more data insert No. 25 on postcard, p. 37.

Metal Cutting Band Saw

Capacity 14x18 in.; maximum clearance under saw blade, 20 in.

Designed for larger cutting jobs, the machine is claimed to do many milling and planing operations,



such as slotting, and removing corners of die blocks. Blade length is 14 ft 5 in. x 1 in. x 0.035 in. Cutting speeds are 60, 90 and 120 fpm. All rotating parts operate on ball bearings. The cutting head is one piece welded construction which includes beams for blade guides and column housing, assuring align-

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The Midwest Body and Manufacturing Division of the Electrographic Corporation chose this 350 ton Clearing press, with 98 inches between uprights, for forming truck channels at their Paris, Ill. plant. They knew that the Clearing would be on the job every day. Clearing dependability assures that press work will be completed according to schedule, unhampered by costly interruptions.

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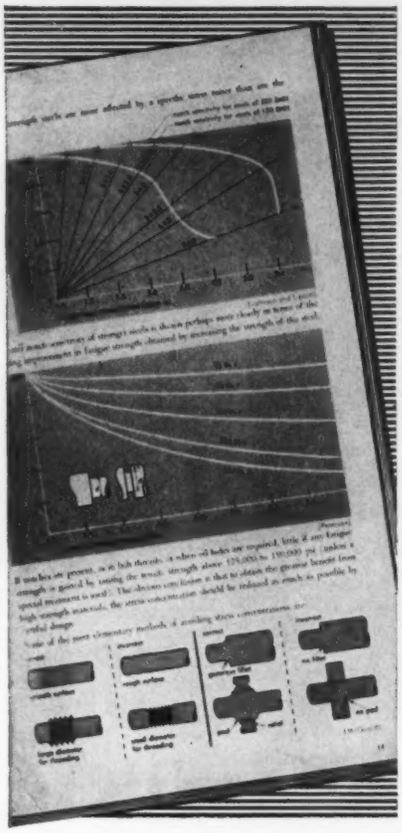

Every designer must be something of a metallurgist

Here are 72 pages packed with information of vital significance to engineers faced with the design, selection and treatment of steel components to give a specified service at minimum cost.

Besides dealing with scientific design, the book gives important metallurgical data, all compiled from the designer's viewpoint. Free on request.

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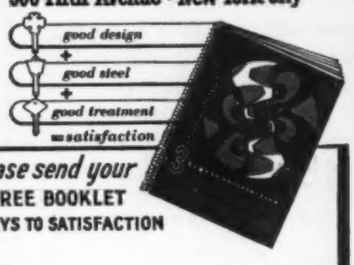

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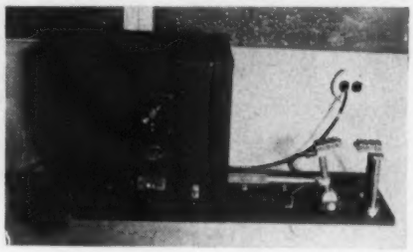
ment and total blade enclosures. Hydraulic control gives maximum efficiency and smoother operation. A 12-in. steel roller stock stand handles all shapes of materials. *W. F. Wells & Sons.*

For more data insert No. 26 on postcard, p. 37.

Soldering Tool

Solenoid operated resistance type; for soft soldering, silver brazing.

The unit illustrated is a 2500 w capacity tool equipped with selector switch that gives instant temperature control at six different settings



to suit the job at hand. It can be furnished with one, six or ten stages of heat control. A time clock giving positive control of the time cycle per connection assures uniform work. No preheating period is required for the tool. *Luma Electric Equipment Co.*

For more data insert No. 27 on postcard, p. 37.

Work Glove

Has wing-type Dura-Thumb with seam on back for longer life.

A new all-purpose work glove has a wing-type all-leather Dura-Thumb with one continuous seam

on the back of the thumb assuring longer life for the glove. Elimination of seams on the front insures more usability at the point of greatest stress—where thumb meets palm. Made of chrome-tanned, side split, cowhide with striped herring-

News about

UNICHROME

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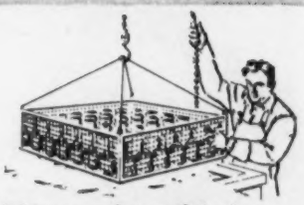
DECORATIVE • PROTECTIVE



Bright, corrosion-resistant DIP FINISH for zinc

The Unichrome Dip Process—a chemical treatment—brightens zinc plate to chromium-like luster and protects it from dulling. Also used to chromate-treat zinc die castings. It provides both *economy* and *quality* in finishing wire goods, screws, nuts, bolts, and a variety of other products.

Three major benefits for plants doing chromium plating

(1) Unichrome S.R.H.S. Chromium offers *higher efficiency*, which enables it to cut plating time 20 to 80%, save power, step-up capacity of existing equipment. (2) It plates *bright* over wider range of current, thus reducing rejects due to the plate "burning" or "missing". (3) It *regulates itself* under normal operating conditions—thereby providing consistently better plating with less supervision.

Chemical-resistant coatings in the heavy-duty class

Unichrome Plastisol and Organosol Compounds, "4000 Series," possess a set of properties seldom found in one material. (1) They have the greater resistance of the vinyls to chemicals, oils, water. (2) This resistance is further increased by the thick coatings—up to 3/16"—that they produce. (3) And because they have flexibility, they withstand mechanical damage as well. (4) They are applied by dipping or spraying, and then baked.

UNITED CHROMIUM INCORPORATED

100 East 42nd St., New York 17, N. Y.
Detroit 20, Mich. • Waterbury 90, Conn.
Chicago 4, Ill. • Los Angeles 13, Calif.
In Canada:
United Chromium Limited, Toronto, Ont.

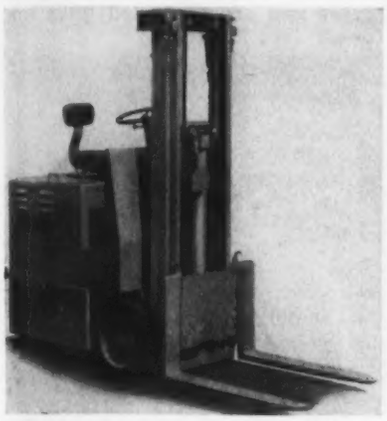
bone flannel back, the glove has water-resistant 2½-in. safety cuff or 4½-in. gauntlet. *Richmond Glove Corp.*

For more data insert No. 28 on postcard, p. 37.

Fork Truck

130-in. tiering by single cylinder low pressure hydraulic lift.

The new Model-230 Jeep fork truck features maximum fork elevation of 130-in. activated by simple, single cylinder low pres-



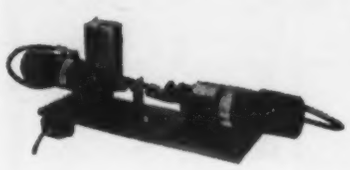
sure hydraulic lift with patented cross suspension. Truck height is standard 83 in. The truck has a short turning radius of 60 in. and provides ample free lift for all stacking purposes. New operating features include inclined automotive steering, foot pedal acceleration, convenient hoist and tilt controls, and good visibility. *Mercury Mfg. Co.*

For more data insert No. 29 on postcard, p. 37.

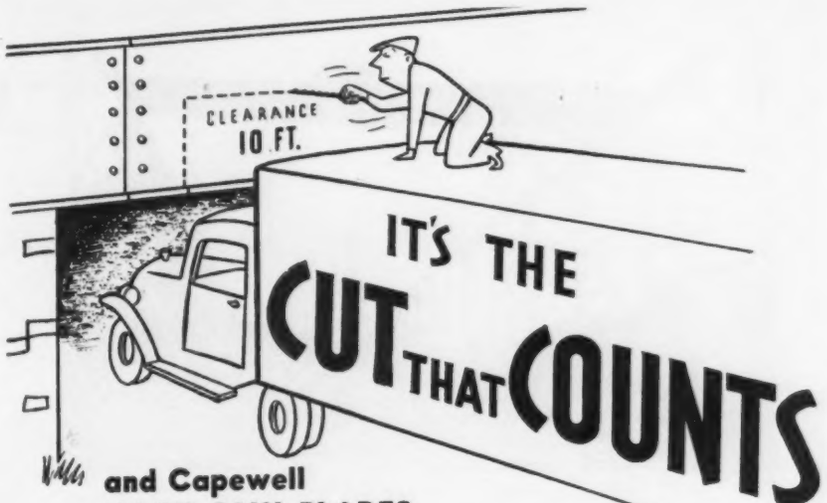
Automatic Drilling Unit

Speeds up drilling cross-holes in parts of varying sizes and shapes.

A simple, inexpensive setup of automatic drilling units drills cross-holes in fishing tackle swivels of 7 different sizes. With the two



drilling units operating simultaneously, the cross-holes are drilled at a rate of up to 1000 per hr. The part is clamped and unclamped automatically. The setup is adaptable to a variety of parts by chang-



and Capewell
HACK SAW BLADES
Give You 10% More Cutting

Thanks to Capewell's exclusive "Statistical Quality Control" during manufacture, you get a bonus of 10% additional cutting because standards are raised and sub-standard blades have been eliminated. In addition, you get another advantage exclusive with Capewell—the printed blade, carrying instructions for proper use.

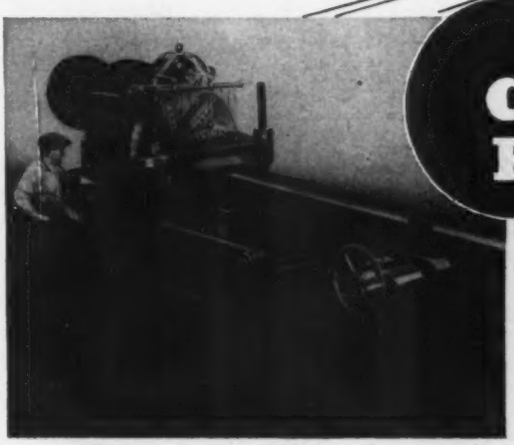
Ask your distributor, too, for these other top-grade Capewell tools: hack saw frames, band saws (in coils or welded), Dafiles, ground flat stock, and hammers, pipe and bolt threaders, pipe cutters, pipe reamers, pipe vises, tubing cutters, power pipe machinery.

CAPEWELL 1881 THE KEY TO ECONOMY

THE CAPEWELL MFG. CO. Dept. 710, Hartford 2, Conn.

THE TREND IS TO THOMAS

FOR *Column End-Facing*



THOMAS COLUMN FACERS

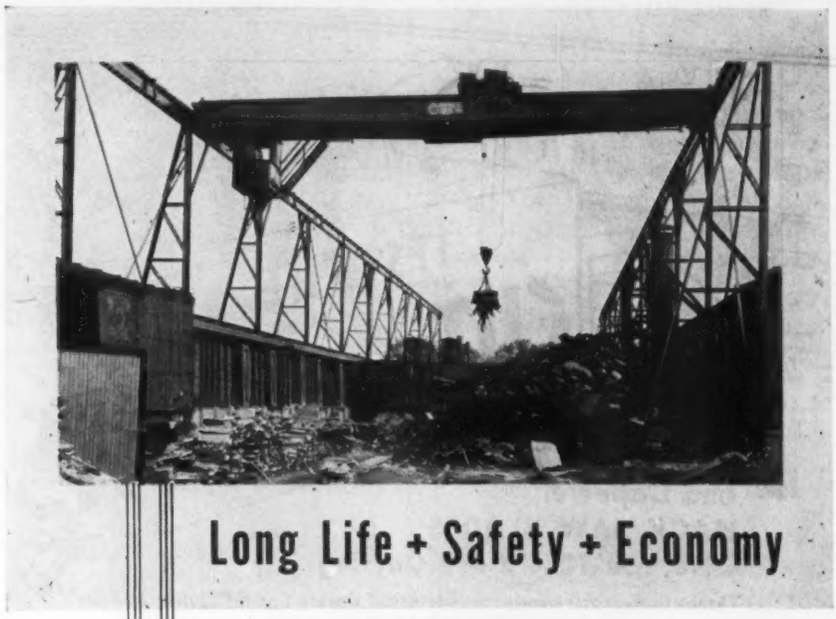
- Rim Driven Cutter Head with angle offset blades
- Anti-friction bearings
- Quick-Acting Pneumatic Clamp
- Hydraulic Feed

Write for Bulletin 316

THOMAS MACHINE MANUFACTURING COMPANY
PITTSBURGH (23), PA.

8A

PUNCHES • SHEARS • PRESSES • BENDERS • SPACING TABLES



Long Life + Safety + Economy

BEDFORD CRANES

No crane is worth buying if it doesn't give you these three qualities. But it has got to give you *more* . . . it must be built to do your particular job most efficiently. That's BEDFORD's business—any crane, any lift or span, 5 to 150 tons capacity. With another plus—a superior source for structural steel, steel buildings and gray iron castings.

Write for new catalog.

BEDFORD FOUNDRY & MACHINE CO.
Bedford, Indiana

NEW YORK OFFICE—280 MADISON AVENUE—MURRAY HILL 5-0233

WILLIAMS-WHITE *Hydraulic* BULLDOZER

. . . A Versatile Horizontal Press

- 200-Ton Capacity
- Die Space, 36, 48 and 60 in.
- Stroke, 24 in.
- Adjustable End-lug
- Foot Button or Treadle Control

MAKERS OF QUALITY PRODUCTION TOOLS FOR NEARLY 100 YEARS

WILLIAMS-WHITE & Co.
703 THIRD AVE., MOLINE, ILLINOIS

ing the design of the holding fixture. *Govro-Nelson Co.*

For more data insert No. 30 on postcard, p. 37.

Panel Instruments

Conventional and modernistic design in 4½, 3½ and 2½-in size models.

Large, easy-to-read scales provide greater readability under all light conditions. Etched faces extend across the entire front of the meters and are protected with un-

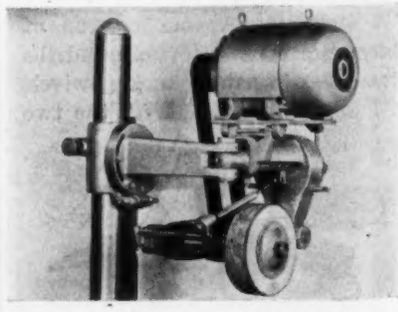
breakable plastic. Vertical chrome-plated strips are recessed into the plastic, fluted cover. Special, open scale layouts permit the use of customer's name, trademark or effective color combinations. *Simpson Electric Co.*

For more data insert No. 31 on postcard, p. 37.

Polishing Heads

Versatile in positioning and action; rated 10 to 15 hp and 5 to 7½ hp.

A new universal polishing or buffing head is a compact, low cost head that provides versatility in use. The heads operate right or



left hand, without extra brackets or extensive mechanical adjustment. Changeover can be quickly and easily made. Heads operate on 3-ft centers. *Murray-Way Corp.*

For more data insert No. 32 on postcard, p. 37.

Resume Your Reading on Page 41

Briefs and Bulletins

steel prices up—The Stanley Works has announced price increases on several items, effective October 12, per 100 lb, base Pittsburgh, as follows: hot-rolled carbon strip, $3.75; cold-rolled carbon strip, $4.85. Cold-rolled spring steel prices are: 0.26 to 0.40 carbon, $4.85; 0.41 to 0.60 carbon, $6.30; 0.61 to 0.80 carbon, $6.90; 0.81 to 1.05 carbon, $8.85; 1.06 to 1.35 carbon, $11.15. Hot-rolled carbon products within the sheet, plate or bar classification are increased 25c per 100 lb. Cold-rolled carbon products with the sheet or flat-wire classification are increased 35c per 100 lb.

slow deliveries—A Purchasing Agents Assn. of Chicago survey discloses that deliveries by suppliers in September did not improve over August and in nine out of ten cases were slower. Ninety-two pct of members surveyed said that they paid higher prices for principal items during September. Nearly half claimed they had to buy as much as 10 to 30 pct of their steel from other than regular sources.

appliances up—Westinghouse Electric Corp. has increased prices on automatic washers, dishwashers, garbage disposers, and water heaters. Similar adjustments will be made on other products, especially refrigerators, home freezers, and ranges. Effective Nov. 1, the increases range from $5.00 to $40.00.

refractories prices—Refractories producers have advanced prices of clay and silica brick 10 pct, and basic grades approximately $5.00 per ton. Increases are effective Oct. 1. Specialty products, including high temperature mortar and ramming materials, were up an average of 8 pct, effective Sept. 16.

stockpile cobalt—France will ship this country 7200 tons of Moroccan cobalt concentrates for stockpiling. The shipments, which will be made in return for Marshall Plan aid in modernizing Moroccan mines, must be completed by Nov. 1, 1952.

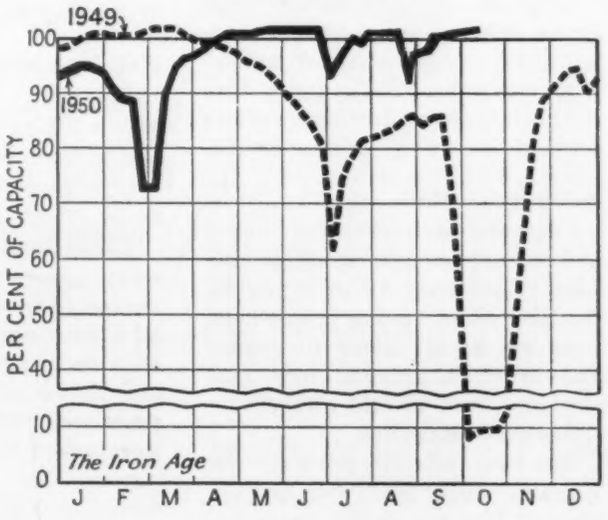
coke prices up—Quotations on coke were up at Detroit to $23.00, and at Swedeland, Pa., to $22.00. Coke at St. Louis is priced at $24.90 on an f.o.b. basis.

pig iron notes—Bethlehem raised all pig iron prices by $3.00 per gross ton. New prices are: Basic, $51.00; No. 2 foundry, $51.50; malleable, $52.00; bessemer, $52.50; and low phos, $57.00. Good news for foundries in the Philadelphia district is that the Alan Wood blast furnace went into blast early this week. The Royal Dutch furnace at Ijmuiden, Holland, is being relined and will be out of blast until January, but Belgian foundry pig iron is being offered at $54.00 per gross ton c.i.f. Philadelphia. A 75c per ton duty is added to this. Inland Steel Co. upped basic and malleable pig iron $3.00 a ton, effective Oct. 13.

J & L special grades—Jones & Laughlin Steel Corp. has advanced extra charges, effective Oct. 10, on turned and polished, turned, ground and polished and cutter bars, $10.00 per ton; drawn, ground and polished and "Electreat" round bars, $5.00 per ton; "Electreat" squares, hexagons, and flats, $10.00 per ton.

nuts, bolts higher—Nut and bolt producers have increased their prices as much as 15 pct, effective Sept. 18. The increases cover certain sizes of machine and carriage bolts, nuts, and cap and set screws.

Steel Operations**



District Operating Rates—Per Cent of Capacity**

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
Oct. 8	100.0	103.0	96.5*	94.0	95.5	104.0	102.0	104.0	106.5*	104.0	89.0	94.0	114.0	101.5
Oct. 15	100.0	102.5	94.5	94.0	97.0	104.0	101.0	104.0	103.0	103.0	89.0	95.0	115.0	102.0

* Revised.
** Steel operations for the first half of 1950 are based on annual capacity of 99,392,800 net tons. Beginning July 1, 1950, operations are based on new annual capacity of 100,363,500 net tons.

Nonferrous Metals OUTLOOK

Market Activities

U. S. refined copper stocks rose in September in spite of increased deliveries . . . Copper, brass, and aluminum scrap prices still rising . . . Government asks aluminum expansion.

New York — The brass mill prices are in an extremely confusing state at present. Several price schedules are in effect, the difference being due to source of copper and wage agreements of the various producing companies. The muddle could not exist if there were no shortages of copper and zinc.

Statistics issued by the Copper Institute showed deliveries to fabricators in the U. S. of 119,529 net tons during the month of September. Despite the increase in deliveries, refined stocks on hand at the end of the month totaled 58,748 tons, an increase of 7796 tons over the previous month.

The world picture is a little different, however, with stocks of refined copper dropping 16,366 tons to a world total of 192,127. World production of both refined and crude copper dropped somewhat, while U. S. production of refined copper increased 3371 tons in September. U. S. production of crude copper was down for the month.

Scrap in Turmoil

Custom smelters' and ingot makers' prices on brass scrap have been raised from 1¢ to 2¢ per lb. Dealers' scrap buying prices have gone up on all items in copper and brass, aluminum, new zinc clippings, and several of the miscellaneous categories.

The new "official" price for No. 1 heavy copper and wire is at a high of 23¢ per lb but there are continued reports of sales for conversion at higher than the price of new copper.

Aluminum crankcases, old sheet, utensils, 24S dural clips, and cast aluminum are now bringing 14½¢ to 15¢ per lb. Pistons and struts are priced at 11½¢ to 12¢, 2S clippings at 17½¢ to 18¢, and borings and turnings at 10¢ per lb.

New zinc clippings are up 1¢ to 14½¢ to 15¢ per lb. Nickel and Monel are unchanged in price but they are practically unobtainable. Block tin is up to 83¢ to 85¢ per lb. Pewter, babbit, solder joints, syphon tops, and various grades of type are all higher this week.

It all spells a continued and terrific turmoil in the scrap metals trade this week.

Ask Aluminum Expansion

Secondary aluminum ingots are also a little higher this week with the spreads being narrowed down somewhat and most of the buying going on at the upper figure.

Expansion of this country's primary aluminum production was requested by the Munitions Board at a meeting with Aluminum Co. of America, Reynolds Metals Co., and Kaiser Aluminum Co. Representatives of these companies were asked how much the industry could be expected to expand by mid-1953 and mid-1954.

Specific queries were advanced as to financial ability, availability of raw materials and power facilities for this proposed expansion. A meeting is planned as soon as the figures are submitted. This should take place sometime before the end of this month.

Nothing further has been reported on the proposal to obtain aluminum from Canada for the national stockpile. Under that proposal it was planned to purchase 200,000 tons of aluminum over a 3-year period.

Trading in tin went on throughout last week and into this week at the record high prices with very little fluctuation. The New York market was firm.

A total of 277,312 tons of refined lead were imported into the U. S. during the first 8 months of 1950. According to the American Bureau of Metal Statistics this is about 55 pct over the same period last year.

NONFERROUS METALS PRICES

	Oct. 11	Oct. 12	Oct. 13	Oct. 14	Oct. 16	Oct. 17
Copper, electro, Conn.	24.50	.....	24.50	24.50	24.50	24.50
Copper, Lake, delivered	24.625	.....	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.115	.....	$1.11375	.....	$1.115	*$1.1225
Zinc, East St. Louis	17.50	.....	17.50	17.50	17.50	17.50
Lead, St. Louis	15.80	.....	15.80	15.80	15.80	15.80

Note: Quotations are going prices.
*Tentative.

MILL PRODUCTS

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 30.1¢; 4S, 61S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 75S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 75S-O, 75S-OAL, 41.8¢; 0.032 in., 2S, 3S, 32.9¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.

Plate: ¼ in. and heavier: 2S, 3S-F, 28.3¢; 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 37.5¢ to 74.5¢; 12 to 14, 38.2¢ to 89¢; 24 to 26, 41.1¢ to $1.22; 36 to 38, 46.9¢ to $1.83.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 38.5¢; cold-finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-T3, ⅛ to 11/32 in., 53.5¢ to 42¢; ⅜ to 1½ in., 41.5¢ to 39¢; 1 9/16 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 39.5¢ to 29¢; 52S, 48¢ to 35¢; 56S, 51¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 75S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63S-T5, OD in in.: 1¼ to 2, 37¢ to 54¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.142; 96 in., $1.522; 120 in., $1.902; 144 in., $2.284. Gage 0.024 in. x 28 in., 72 in., $1.379; 96 in., $1.839; 120 in., $2.299; 144 in., $2.759. Coiled Sheet: 0.019 in. x 28 in., 28.2¢ per lb; 0.024 in. x 28 in., 26.9¢ per lb.

Magnesium

Does not reflect latest increase.

(Cents per lb, f.o.b. mill, freight allowed)

Sheet and Plate: M-O, FS-O. ¼ in. 58¢ to 60¢; 3/16 in. 60¢ to 62¢; ⅛ in. 62¢ to 64¢; B & S gage 10, 63¢ to 65¢; 12, 67¢ to 69¢; 14, 73¢ to 78¢; 16, 80¢ to 85¢; 18, 88¢ to 93¢; 20, $1.00 to $1.05; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, FS, diam in., ¼ in. to 0.311, 66¢; ½ in. to ¾, 50¢; 1¼ to 1.749, 47¢; 2½ to 5 in., 45¢. Other alloys higher. Base: Up to ¾ in., diam, 10,000 lb; ¾ in. to 1¾ in., 20,000 lb; 1¾ in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M, FS, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb per ft, per. up to 3.5 in., 59.5¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 55¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 50.5¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 47.5¢ 4 to 6 lb per ft, per. up to 28 in. 46.5¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ lb to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, FS, wall thickness, outside diam, in., 0.049 to 0.057, ¼ in. to 5/16, $1.40; 5/16 to ⅜, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76¢; 0.165 to 0.219, ⅝ to ¾, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Nickel and Monel

(Base prices, cents per lb, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	69	53
Strip, cold-rolled	75	56
Rods and bars	65	51
Angles, hot-rolled	65	51
Plates	67	52
Seamless tubes	98	86
Shot and blocks	..	46

Copper, Brass, Bronze

(Cents per lb, freight prepaid on 200 lb, includes copper import duty)

	Sheets	Rods	Extruded Shapes
Copper	41.68	....	41.28
Copper, h-r	....	36.78	....
Copper, drawn	....	38.78	....
Low brass	38.92	38.61	....
Yellow brass	38.28	37.97	....
Red brass	40.14	39.83	....
Naval brass	42.33	37.14	38.40
Leaded brass	....	32.63	36.70
Com'l bronze	41.13	40.82	....
Manganese bronze	45.96	40.65	41.41
Phosphor bronze	60.20	60.45	....
Muntz metal	40.43	36.74	37.99
Everdur, Herculoy, Olympic, etc.	43.97	42.91	....
Nickel silver 10 pct	49.27	51.49	....
Arch. bronze	....	....	35.11

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	18.00
Antimony, American, Laredo, Tex.	32.00
Beryllium metal, 95%, lumps, beads	$95.00
Beryllium copper, 3.75-4.25% Be, dollars per lb contained Be	$30.00
Beryllium aluminum 5% Be, dollars per lb contained Be	$65.00
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.40
Cobalt, 97-99% (per lb)	$1.80 to $1.87
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$220
Lead St. Louis	15.80
Lead, New York	16.00
Magnesium, 99.8+%, f.o.b. Freeport Tex., 10,000 lb	24.50
Magnesium, sticks, 100 to 500 lb	42.00 to 44.00
Mercury, dollars per 76-lb flask f.o.b. New York	$90 to $95
Nickel, electro, f.o.b. New York	51.22
Nickel oxide sinter, f.o.b. Copper Cliff, Ont., contained nickel	44.25
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$100 to $103
Silver, New York, cents per oz.	72.75
Tin, New York	$1.1225
Zinc, East St. Louis	17.50
Zinc, New York	18.22
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	27.00
No. 120	26.50
No. 123	26.00
80-10-10 ingot	
No. 305	31.00
No. 315	28.50
88-10-2 ingot	
No. 210	42.00
No. 215	39.00
No. 245	33.00
Yellow ingot	
No. 405	23.75
Manganese bronze	
No. 421	31.00

Aluminum Ingot

(Cents per lb, 30,000 lb lots)

95-5 aluminum-silicon alloys	
0.30 copper, max.	31.00-31.50
0.60 copper, max.	30.75-31.25
Piston alloys (No. 122 type)	27.25-28.00
No. 12 alum. (No. 2 grade)	27.00-27.50
108 alloy	28.00-28.25
195 alloy	28.50-29.00
13 alloy	31.00-31.50
AXS-679	27.50-28.50

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	28.00-28.50
Grade 2—92-95%	27.00-27.50
Grade 3—90-92%	26.50-27.00
Grade 4—85-90%	26.00-26.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	39⅛
Electrodeposited	33⅜
Rolled, oval, straight, delivered	38⅞
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34¾
Zinc, oval	26½
Ball anodes	25½
Nickel 99 pct plus	
Cast	68.00
Rolled, depolarized	69.00
Cadmium	$2.65
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	79½

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	52.15
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt allowed	20½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz.	61¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drums	45.85

SCRAP METALS

Brass Mill Scrap

(Cents per pound; add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	23	22¼
Yellow brass	20⅛	18⅝
Red brass	21½	20¾
Comm. bronze	21⅝	21
Mang. bronze	19½	18⅝
Brass rod ends	19⅞	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	21.75
No. 2 copper wire	20.75
Light copper	19.75
Refinery brass	20.50*
Radiators	16.50

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	21.75
No. 2 copper wire	20.75
Light copper	19.75
No. 1 composition	21.00
No. 1 comp. turnings	20.50
Rolled brass	18.00
Brass pipe	20.00
Radiators	16.50
Heavy yellow brass	16.00
Aluminum	
Mixed old cast	16.00
Mixed old clips	16.50
Mixed turnings, dry	15.50
Pots and pans	16.00
Low copper	18.50

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	22½—23
No. 2 heavy copper and wire	21 —21½
Light copper	20 —20½
New type shell cuttings	20 —20½
Auto radiators (unsweated)	14 —14½
No. 1 composition	18 —18½
No. 1 composition turnings	17½—18
Clean red car boxes	15½—16
Cocks and faucets	15½—16
Mixed heavy yellow brass	13 —13½
Old rolled brass	14¼—14¾
Brass pipe	16½—17
New soft brass clippings	18 —18½
Brass rod ends	16¾—17
No. 1 brass rod turnings	16 —16¼

Aluminum

Alum. pistons and struts	11½—12
Aluminum crankcases	14½—15
2S aluminum clippings	17½—18
Old sheet and utensils	14½—15
Borings and turnings	10
Misc. cast aluminum	14½—15
Dural clips (24S)	14½—15

Zinc

New zinc clippings	14½—15
Old zinc	11¼—11½
Zinc routings	8¼— 8¾
Old die cast scrap	8¼— 8¾

Nickel and Monel

Pure nickel clippings	50 —60
Clean nickel turnings	47 —57
Nickel anodes	50 —60
Nickel rod ends	50 —60
New Monel Clippings	17 —21
Clean Monel turnings	15 —17
Old sheet Monel	16 —20
Inconel clippings	22 —26
Nickel silver clippings, mixed	13 —14
Nickel silver turnings, mixed	12 —13

Lead

Soft scrap, lead	13 —13¼
Battery plates (dry)	8 — 8¼

Magnesium

Segregated solids	9 —10
Castings	5½— 6½

Miscellaneous

Block tin	83 —85
No. 1 pewter	63 —65
No. 1 auto babbitt	57 —59
Mixed common babbitt	13 —13½
Solder joints	18½—19
Siphon tops	53 —55
Small foundry type	17 —17½
Monotype	16 —15½
Lino. and stereotype	15 —15½
Electrotype	13¾—14¼
Hand picked type shells	7 — 7½
Lino. and stereo. dross	4¾— 5¼
Electro. dross	3¼— 3½

MARKETS—PRICES—TRENDS

SCRAP

Iron & Steel

Railroad Grades Continue Skyward Flight

The formula price front still held this week but a few more storm warnings were sent out in scrap centers—perhaps adding a few more straws to the camel's back. Threatening to outflank formulas were the firecracker activity and great strength of railroad and cast grades and the increasing difficulty of consumers in getting melting grades at formula prices.

Railroad grades were "running wild" in Pittsburgh—with scrap rails gaining $3.00 and short rails, $7.00 a ton. In Chicago, railroad items zoomed upward, their gains ranging up to $9.00 a ton. Philadelphia, Buffalo markets also saw railroad items move up.

Consumers were having an increasingly tougher job locating melting grades at formula and bundles were reported in short supply. Some sources in Philadelphia thought that the formula was cracking at the seams and small sales were reported as high as $44.00 a ton. Detroit reported indications of a tightening scrap market.

PITTSBURGH—Consumers are finding it increasingly difficult to obtain melting grades at formula prices. No. 1 and No. 2 and No. 2 bundles are in very short supply. No. 1 bundles are up 50¢ to $46.50, top, since some mills are paying the low phos "formula" price for this grade. Low phos was up $2.00. The railroad grades were running wild on bidding by foundries due to the pig iron shortage. Scrap rails were up $3.00 to $61.00, and short rails jumped $7.00 to $68.00. Specialties also were stronger. The latest railroad list did not include No. 1 RR heavy melting, which was allocated to consumers at an unannounced price. Cast scrap moved up again.

CHICAGO—A major consumer came into the market last week and bought No. 1 heavy melting steel, No. 2 heavy melting and No. 2 bundles at formula prices for $40.00, $38.00 and $35.00 per gross ton respectively. The tonnage was not disclosed. Cast grades advanced considerably due to the high demand of foundries. Some mills have been buying cast for use in openhearths. Railroad items are still bringing higher prices with conversion deals and foundry demand increasing.

PHILADELPHIA—The market this week is wilder than ever. While the mills are holding the formula on steel grades, small sales as high as $44.00 per ton have been reported for No. 1 steel and there is a general feeling in the trade that the formula is cracking at the seams. There is also some feeling that the formula might be raised. Most other prices are up this week and the cast market is so high that it is a strong inducement for the importation of cast grades. Shipments to the mills are falling off and there is a lot of earmarking being done.

NEW YORK—Fair movement of scrap was reported in this market while the heavy grades held to last week's prices. Cast grades took a breather after their upward spurt but market tone was reported as very strong. No. 2 bundles moved up to a $29.00 top, a gain of 50¢. Mixed borings and turnings and shoveling turnings registered a similar advance to a top of $25.00.

DETROIT—There are definite indications this week of a tightening scrap market but the price line is still holding. Variations from the formula appear to be taking the form of upgrading. The anticipation here is that, electric steel plants in particular will find themselves in an increasingly difficult position with respect to scrap as time goes on. Thus far, dealer resistance to existing prices has been spotty. Plant scrap is reported to be selling at formula and next week's lists are expected to go at these prices. The cast iron market continues strong.

CLEVELAND—At least one major consumer in the Valley is paying springboards this week and it is likely that other scrap-minus areas will follow. Tonnage is tight at the formula and the competition from foundries for the good grades is for blood. On the other hand, some openhearths are buying cast, big stuff. A certain amount of tonnage is still owed in the valley at $41.00, which only goes to prove that hope springs eternal. It now appears major consumers will be able to keep the lid on the formula during October, but in the meantime, next step will probably be shipping point prices, or springboards, for everybody.

ST. LOUIS—Scrap iron prices here are generally unchanged. Railroad lists are bringing high prices, and the tonnage is light. Dealers report the movement of melting grades is small. Rerolling rails are especially strong.

CINCINNATI—A major effort is being made to put this market on the formula and keep it there. As a result, some tonnage was sold this week at $42.50 f.o.b. cars. Fundamentally, the market is in turmoil. Demand is terrific and while small lot dealing is at the formula, what the outside stuff is bringing is anybody's guess. Foundry grades are very strong.

BOSTON—A sharp advance in cast grade prices highlighted market activity here. While there was activity in everything—scrap and cast—it was the $2.00 advance in No. 1 machinery cast and from $2.00 to $4.00 in other cast items that featured the market. No. 2 heavy, No. 2 bundles, and machine shop turnings moved up by 50¢ but No. 1 heavy melting, showing strength for the past few weeks, did not advance.

BIRMINGHAM—Demand for scrap continues strong, but with very little coming into the district. Brokers and dealers are taking everything offered and looking for more, but even last week's boost in prices of most categories failed to increase the flow to any great extent. Some dealers are buying scrap rails and cutting them to 2 ft and under to get higher prices and meet demand for them.

BUFFALO—Mixed tendencies ruled the scrap trade as some dealers reported the possibility of additional orders being placed at formula prices while others in the area admitted exceeding the voluntary scales to obtain material. An order to a smaller consumer was reported in No. 1 material at $1.50 above the formula. It was pointed out that the top mill consumer here received little No. 1 material.

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Iron and Steel

SCRAP PRICES

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$43.50 to $44.00
No. 2 hvy. melting	40.50 to 41.00
No. 1 bundles	46.00 to 46.50
No. 2 bundles	38.50 to 39.00
Machine shop turn.	34.00 to 34.50
Mixed bor. and ms. turns.	34.50 to 35.00
Shoveling turnings	37.50 to 38.00
Cast iron borings	37.00 to 37.50
Low phos. plate	51.50 to 52.00
Heavy turnings	44.50 to 45.00
No. 1 RR. hvy. melting	44.00 to 45.00
Scrap rails, random lgth.	60.50 to 61.00
Rails 2 ft and under	67.00 to 68.00
RR. steel wheels	56.00 to 57.00
RR. spring steel	56.00 to 57.00
RR. couplers and knuckles	56.00 to 57.00
No. 1 machinery cast	54.50 to 55.00
Mixed yard cast.	48.50 to 49.00
Heavy breakable cast.	46.50 to 47.00
Malleable	63.00 to 64.00

Chicago

No. 1 hvy. melting	$39.50 to $40.00
No. 2 hvy. melting	37.50 to 38.00
No. 1 factory bundles	39.50 to 40.00
No. 1 dealers' bundles	39.50 to 40.00
No. 2 dealers' bundles	34.00 to 35.00
Machine shop turn.	31.00 to 32.00
Mixed bor. and turn.	31.00 to 32.00
Shoveling turnings	33.00 to 34.00
Cast iron borings	33.00 to 34.00
Low phos. forge crops	52.00 to 53.00
Low phos. plate	51.00 to 52.00
No. 1 RR. hvy. melting	44.50 to 45.50
Scrap rails, random lgth.	59.00 to 60.00
Rerolling rails	64.00 to 65.00
Rails 2 ft and under	63.50 to 65.00
Locomotive tires, cut	54.00 to 55.00
Cut bolsters & side frames	52.00 to 53.00
Angles and splice bars	61.00 to 62.00
RR. steel car axles	88.00 to 89.00
RR. couplers and knuckles	65.00 to 66.00
No. 1 machinery cast.	54.00 to 55.00
No. 1 agricul. cast.	50.00 to 51.00
Heavy breakable cast.	44.00 to 45.00
RR. grate bars	43.50 to 44.50
Cast iron brake shoes	46.50 to 47.50
Cast iron car wheels	54.00 to 55.00
Malleable	65.00 to 66.00

Philadelphia

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 bundles	38.00 to 39.00
No. 2 bundles	31.00 to 32.00
Machine shop turn.	28.00 to 29.00
Mixed bor. and turn.	26.00 to 27.00
Shoveling turnings	32.00 to 33.00
Low phos. punchings, plate	47.00 to 48.00
Low phos. 5 ft and under	46.00 to 47.00
Low phos. bundles	44.00 to 45.00
Hvy. axle forge turn.	38.00 to 39.00
Clean cast chem. borings	39.00 to 40.00
RR. steel wheels	49.00 to 50.00
RR. spring steel	49.00 to 50.00
Rails 18 in. and under	59.00 to 60.00
No. 1 machinery cast.	51.00 to 52.00
Mixed yard cast.	46.00 to 47.00
Heavy breakable cast.	46.00 to 47.00
Cast iron carwheels	54.00 to 55.00
Malleable	59.00 to 60.00

Cleveland

No. 1 hvy. melting	$43.00 to $43.50
No. 2 hvy. melting	40.00 to 40.50
No. 1 busheling	43.00 to 43.50
No. 1 bundles	43.00 to 43.50
No. 2 bundles	28.00 to 28.50
Machine shop turn.	35.00 to 35.50
Mixed bor. and turn.	36.00 to 36.50
Shoveling turnings	37.00 to 37.50
Cast iron borings	37.00 to 37.50
Low phos. 2 ft and under	45.50 to 46.00
Steel axle turn.	43.00 to 43.50
Drop forge flashings	43.00 to 43.50
No 1 RR. hvy. melting	43.50 to 44.00
Rails 3 ft and under	65.00 to 66.00
Rails 18 in. and under	66.00 to 67.00
No. 1 machinery cast.	62.00 to 63.00
RR. cast.	62.00 to 63.00
RR. grate bars	45.00 to 46.00
Stove plate	50.00 to 51.00
Malleable	66.00 to 67.00

Youngstown

No. 1 hvy. melting	$43.50 to $44.00
No. 2 hvy. melting	40.50 to 41.00
No. 1 bundles	43.50 to 44.00
No. 2 bundles	$38.50 to $39.00
Machine shop turn.	35.50 to 36.00
Shoveling turnings	37.50 to 38.00
Cast iron borings	37.50 to 38.00
Low phos. plate	46.00 to 46.50

Buffalo

No. 1 hvy. melting	$41.00 to $42.00
No 2 hvy. melting	37.50 to 38.50
No 1 busheling	37.50 to 38.50
No. 1 bundles	39.50 to 40.00
No. 2 bundles	36.00 to 36.50
Machine shop turn.	31.50 to 32.50
Mixed bor. and turn.	31.50 to 32.50
Shoveling turnings	33.50 to 34.50
Cast iron borings	31.50 to 32.50
Low phos. plate	47.00 to 48.00
Scrap rails, random lgth.	49.00 to 50.00
Rails 2 ft and under	55.00 to 56.00
RR. steel wheels	50.00 to 51.00
RR. spring steel	50.00 to 51.00
RR. couplers and knuckles	50.00 to 51.00
No. 1 machinery cast.	51.00 to 52.00
No. 1 cupola cast.	44.00 to 45.00
Small indus. malleable	55.00 to 58.00

Birmingham

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	33.00 to 34.00
No. 2 bundles	31.00 to 32.00
No. 1 busheling	34.00 to 35.00
Machine shop turn.	27.00 to 28.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	25.00 to 26.00
Bar crops and plate	44.00 to 45.00
Structural and plate	44.00 to 45.00
No. 1 RR. hvy. melting	41.00 to 42.00
Scrap rails, random lgth.	48.00 to 49.00
Rerolling rails	58.00 to 59.00
Rails 2 ft and under	59.00 to 60.00
Angles & splice bars	54.00 to 55.00
Std. steel axles	59.00 to 60.00
No. 1 cupola cast.	54.00 to 55.00
Stove plate	48.00 to 49.00
Cast iron carwheels	46.00 to 47.00

St. Louis

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	36.00 to 37.00
No. 2 bundled sheets	35.00 to 36.00
Machine shop turn.	27.50 to 28.50
Shoveling turnings	30.00 to 31.00
Rails, random lengths	53.00 to 55.00
Rails 3 ft and under	56.00 to 58.00
Locomotive tires, uncut	47.00 to 48.00
Angles and splice bars	54.00 to 55.00
Std. steel car axles	76.00 to 78.00
RR. spring steel	49.00 to 50.00
No. 1 machinery cast.	48.00 to 49.00
Hvy. breakable cast.	40.00 to 42.00
Cast iron brake shoes	45.00 to 46.00
Stove plate	40.00 to 41.00
Cast iron car wheels	48.00 to 49.00
Malleable	58.00 to 60.00

New York

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$34.00 to $34.50
No. 2 hvy. melting	29.00 to 30.00
No. 2 bundles	28.50 to 29.00
Machine shop turn.	24.00 to 25.00
Mixed bor. and turn.	24.00 to 25.00
Shoveling turnings	26.00 to 27.00
Clean cast chem. bor.	34.50 to 35.50
No. 1 machinery cast.	39.00 to 40.00
Mixed yard cast.	37.50 to 38.50
Charging box cast.	37.50 to 38.50
Heavy breakable cast.	37.50 to 38.50
Unstrp. motor blocks	32.00 to 33.00

Boston

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$32.50
No. 2 hvy. melting	$28.00 to 28.50
No. 1 bundles	32.50
No. 2 bundles	$27.00 to $27.50
Machine shop turn.	23.50 to 24.00
Mixed bor. and turn.	23.00 to 23.50
Shoveling turnings	25.00 to 25.50
No. 1 busheling	31.50 to 32.00
Clean cast chem. borings	29.00 to 30.00
No. 1 Machinery cast.	40.00 to 41.00
Mixed cupola cast.	36.50 to 37.00
Heavy breakable cast.	36.50 to 37.00
Stove plate	32.50 to 33.00

Detroit

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$37.00 to $37.50
No. 2 hvy. melting	30.00 to 31.00
No. 1 bundles	37.00 to 37.50
New busheling	37.00 to 37.50
Flashings	37.00 to 37.50
Machine shop turn.	29.00 to 29.50
Mixed bor. and turn.	29.00 to 29.50
Shoveling turnings	31.00 to 31.50
Cast iron borings	31.00 to 31.50
Low phos. plate	39.00 to 40.00
No. 1 cupola cast.	49.00 to 51.00
Heavy breakable cast.	40.00 to 42.00
Stove plate	42.00 to 43.00
Automotive cast.	53.00 to 54.00

Cincinnati

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$42.00 to $42.50
No. 2 hvy. melting	38.00 to 38.50
No. 1 bundles	42.00 to 42.50
No. 2 bundles, black	38.00 to 38.50
No. 2 bundles, mixed	32.50 to 33.00
Machine shop turn.	26.50 to 27.00
Mixed bor. and turn.	28.50 to 29.00
Shoveling turnings	29.50 to 30.00
Cast iron borings	29.50 to 30.00
Low phos. 18 in. under	54.00 to 55.00
Rails, random lengths	60.00 to 61.00
Rails, 18 in. and under	69.00 to 70.00
No. 1 cupola cast.	61.00 to 62.00
Hvy. breakable cast.	51.00 to 52.00
Drop broken cast.	65.00 to 66.00

San Francisco

No. 1 hvy. melting		$26.50
No. 2 hvy. melting		24.50
No. 1 bundles		26.50
No. 2 bundles		22.50
No. 3 bundles		19.50
Machine shop turn.		13.00
Elec. fur. 1 ft and under		40.00
No. 1 RR. hvy. melting		26.50
Scrap rails, random lgth.		26.50
No. 1 cupola cast.	$43.00 to	46.00

Los Angeles

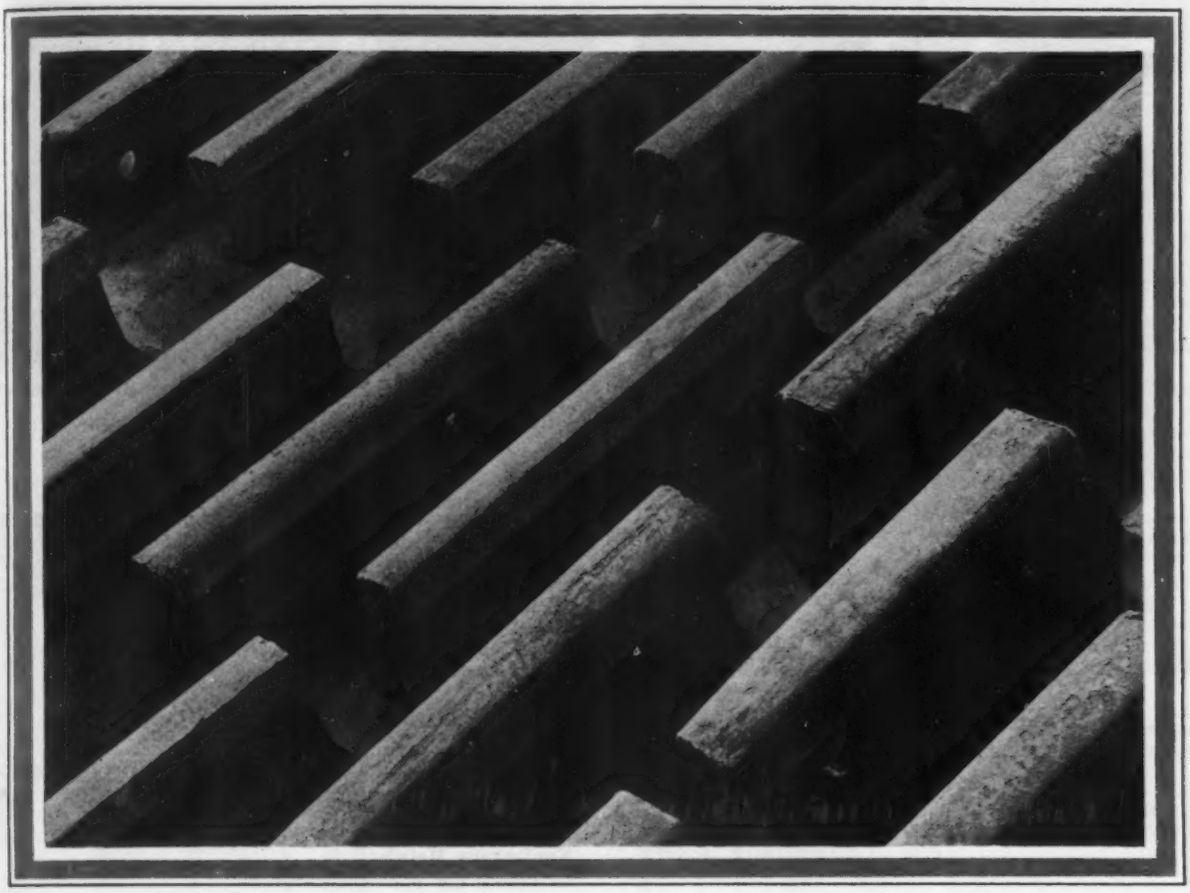
No. 1 hvy. melting		$26.50
No. 2 hvy. melting		24.50
No. 1 bundles		26.50
No. 2 bundles		22.50
No. 3 bundles		19.50
Mach. shop turn.		13.00
Elec. fur. 1 ft and under		42.00
No. 1 RR. hvy. melting		26.50
Scrap rails, random lgth.		26.50
No. 1 cupola cast.	$46.00 to	48.00

Seattle

No. 1 hvy. melting		$24.00
No. 2 hvy. melting		24.00
No. 1 bundles		22.00
No. 2 bundles		22.00
No. 3 bundles		18.00
Elec. fur. 1 ft and under	$29.00 to	30.00
RR. hvy. melting		25.00
No. 1 cupola cast		35.00
Heavy breakable cast.		25.00

Hamilton, Ont.

No. 1 hvy. melting		$30.00
No. 1 bundles		30.00
No. 2 bundles		29.50
Mechanical bundles		28.00
Mixed steel scrap		26.00
Mixed bor. and turn.		23.00
Rails, remelting		30.00
Rails, rerolling		33.00
Bushelings		24.50
Bush., new fact, prep'd.		29.00
Bush., new fact, unprep'd.		23.00
Short steel turnings		23.00
Cast scrap		45.00



cropped rail*

use:

Cut rails are used by foundries and electric furnaces in the making of castings and ingots. This grade of scrap is particularly valuable because it is heavy, short and uniform. It makes a compact, solid charge reducing heat loss in furnaces and allows a maximum charge under the electrodes of the electric furnace.

source:

Old Tee Rails from Railroads and Industrial Sidings.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices

Steel prices in this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel (cents per pound)	Oct. 17, 1950	Oct. 10, 1950	Sept. 19, 1950	Oct. 18, 1949
Hot-rolled sheets	3.35	3.35	3.35	3.25
Cold-rolled sheets	4.10	4.10	4.10	4.00
Galvanized sheets (10 ga)	4.40	4.40	4.40	4.40
Hot-rolled strip	3.25	3.25	3.25	3.25
Cold-rolled strip	4.21	4.21	4.21	4.038
Plate	3.50	3.50	3.50	3.40
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R strip (No. 302)	34.50	34.50	34.50	33.00
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes.	$7.50	$7.50	$7.50	$7.75
Tinplate, electro (0.50 lb)	6.60	6.60	6.60	6.70
Special coated mfg. ternes	6.35	6.35	6.35	6.65
Bars and Shapes: (cents per pound)				
Merchant bars	3.45	3.45	3.45	3.35
Cold-finished bars	4.15	4.145	4.145	3.995
Alloy bars	3.95	3.95	3.95	3.75
Structural shapes	3.40	3.40	3.40	3.25
Stainless bars (No. 302)	30.00	30.00	30.00	28.50
Wrought iron bars	9.50	9.50	9.50	9.50
Wire: (cents per pound)				
Bright wire	4.50	4.50	4.50	4.15
Rails: (dollars per 100 lb)				
Heavy rails	$3.40	$3.40	$3.40	$3.20
Light rails	3.75	3.75	3.75	3.55
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$54.00	$54.00	$54.00	$52.00
Slabs, rerolling	54.00	54.00	54.00	52.00
Forging billets	63.00	63.00	63.00	61.00
Alloy blooms, billets, slabs	66.00	66.00	66.00	63.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	3.85	3.85	3.85	3.40
Skelp	3.15	3.15	3.15	3.25

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Pig Iron: (per gross ton)	Oct. 17, 1950	Oct. 10, 1950	Sept. 19, 1950	Oct. 18, 1949
No. 2, foundry, del'd Phila.	$52.77	51.76	$51.76	$50.42
No. 2, Valley furnace	49.50	49.50	46.50	46.50
No. 2, Southern Cin'ti	52.58	52.58	49.08	46.08
No. 2, Birmingham	45.88	45.88	42.38	39.38
No. 2, foundry, Chicago†	49.50	49.50	46.50	46.50
Basic del'd Philadelphia	51.92	50.92	50.92	49.92
Basic, Valley furnace	49.00	49.00	46.00	46.00
Malleable, Chicago†	49.50	49.50	46.50	46.50
Malleable, Valley	49.50	49.50	46.50	46.50
Charcoal, Chicago	70.56	70.56	68.56	68.56
Ferromanganese‡	173.40	173.40	173.40	173.40

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap: (per gross ton)	Oct. 17, 1950	Oct. 10, 1950	Sept. 19, 1950	Oct. 18, 1949
Heavy melt'g steel, P'gh.	$43.75	$43.75	$43.75	$29.50
Heavy melt'g steel, Phila.	38.50	38.50	38.50	24.50
Heavy melt'g steel, Ch'go	39.75	39.75	40.00	25.50
No. 1 hy. com. sh't, Det.	37.25	37.25	37.75	19.50
Low phos. Young'n	46.25	46.25	46.25	31.75
No. 1 cast, Pittsburgh	54.75	53.75	51.75	39.50
No. 1 cast, Philadelphia	51.50	50.50	45.50	35.50
No. 1 cast, Chicago	54.50	50.50	49.50	42.00
Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$14.25	$14.25	$14.25
Foundry coke, prompt	16.75	16.75	16.25	15.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	24.50	24.50	23.80	17.625
Copper, Lake, Conn.	24.625	24.625	24.625	17.75
Tin Straits, New York	$1.1225	†$1.115*	$1.01	95.75
Zinc, East St. Louis	17.50	17.50	17.50	9.25
Lead, St. Louis	15.80	15.80	15.80	12.80
Aluminum, virgin	19.00	19.00	17.50	17.00
Nickel, electrolytic	51.22	51.22	51.22	42.97
Magnesium, ingot	24.50	24.50	22.50	20.50
Antimony, Laredo, Tex.	32.00	32.00	32.00	32.00

†Tentative. *Revised.

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)

Finished Steel Base Price

Oct. 18, 1950	3.837¢ per lb.
One week ago	3.837¢ per lb.
One month ago	3.837¢ per lb.
One year ago	3.705¢ per lb.

High		Low	
1950	3.837¢ Jan. 3	3.837¢ Jan. 3
1949	3.837¢ Dec. 27	3.3705¢ May 3
1948	3.721¢ July 27	3.193¢ Jan. 1
1947	3.193¢ July 29	2.848¢ Jan. 1
1946	2.848¢ Dec. 31	2.464¢ Jan. 1
1945	2.464¢ May 29	2.396¢ Jan. 1
1944	2.396¢	2.396¢
1943	2.396¢	2.396¢
1942	2.396¢	2.396¢
1941	2.396¢	2.396¢
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939	2.35367¢ Jan. 3	2.26689¢ May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10
1935	2.07542¢ Oct. 1	2.06492¢ Jan. 8
1932	1.89196¢ July 5	1.83910¢ Mar. 1
1929	2.31773¢ May 28	2.26498¢ Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Pig Iron

	$49.36 per gross ton
	49.19 per gross ton
	46.61 per gross ton
	45.88 per gross ton

High		Low	
$49.36	Oct. 17	$45.88	Jan 3
46.87	Jan. 18	45.88	Sept. 6
46.91	Oct. 12	39.58	Jan. 6
37.98	Dec. 30	30.14	Jan. 7
30.14	Dec. 10	25.37	Jan. 1
25.37	Oct. 23	23.61	Jan. 2
$23.61		$23.61	
23.61		23.61	
23.61		23.61	
$23.61	Mar. 20	$23.45	Jan. 2
23.45	Dec. 23	22.61	Jan. 2
22.61	Sept. 19	20.61	Sept. 12
23.25	June 21	19.61	July 6
32.25	Mar. 9	20.25	Feb. 16
19.74	Nov. 24	18.73	Aug. 11
18.84	Nov. 5	17.83	May 14
14.81	Jan. 5	13.56	Dec. 6
18.71	May 14	18.21	Dec. 17

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Scrap Steel

	$40.67 per gross ton
	40.67 per gross ton
	40.75 per gross ton
	26.50 per gross ton

High		Low	
$41.58	Aug. 22	$26.25	Jan. 3
43.00	Jan. 4	19.33	June 28
43.16	July 27	39.75	Mar. 9
42.58	Oct. 28	29.50	May 20
31.17	Dec. 24	19.17	Jan. 1
19.17	Jan. 2	18.92	May 22
19.17	Jan. 11	15.76	Oct. 24
$19.17		$19.17	
19.17		19.17	
$22.00	Jan. 7	$19.17	Apr. 10
21.83	Dec. 30	16.04	Apr. 9
22.50	Oct. 3	14.08	May 16
15.00	Nov. 22	11.00	June 7
21.92	Mar. 30	12.67	June 9
17.75	Dec. 21	12.67	June 8
13.42	Dec. 10	10.33	Apr. 29
8.50	Jan. 12	6.43	July 5
17.58	Jan. 29	14.08	Dec. 8

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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FLEXIBLE SHAFT MACHINES

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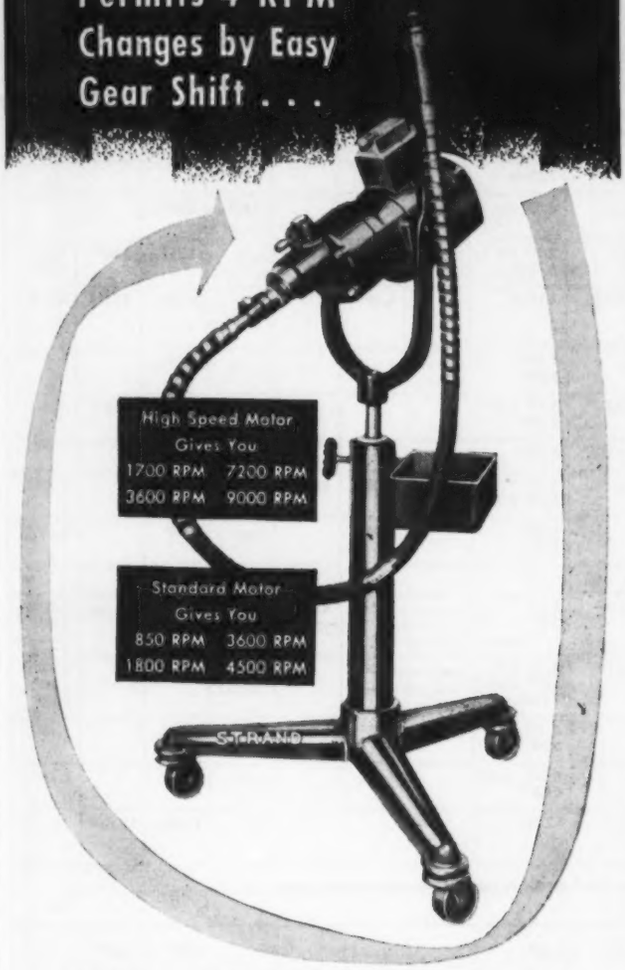
Permits 4 RPM Changes by Easy Gear Shift . . .



Quick change of RPM by an easy gear-shift method makes "STRANDFLEX" a versatile and efficient flexible shaft machine for multiple grinding and finishing. Encased heli-cut hardened steel gears are shifted by a slight rotary and axial movement.

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GRIFFIN
Manufacturing Company
ERIE, PENNSYLVANIA

IRON AGE

STEEL PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middletown	Youngstown	Bethlehem	Buffalo	Conshohocken	Johnstown	Sparrows Point	Granite City	Detroit
INGOTS Carbon forging, net ton	$50.00[1]													$50.00[31]
Alloy, net ton	$51.00[1,17]													$51.00[31]
BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton	$53.00[1]	$53.00[1]	$53.00[1]				$57.00[13]		$53.00[3]	$62.00[26]	$53.00[3]			
Carbon forging billets, net ton	$63.00[1]	$63.00[1,4]	$63.00[1,3]	$63.00[4]			$63.00[25]		$63.00[3,4]	$68.00[26]	$63.00[3]			$66.00[31]
Alloy, net ton	$66.00[1,17]	$66.00[1,4]	$66.00[1]		$66.00[4,42]			$66.00[3]	$66.00[3,4]	$70.00[26]	$66.00[3]			$69.00[31]
PIPE SKELP	3.15[1]						3.15[1,4]							
WIRE RODS	3.85[2] 4.05[18]	3.85[2,4,33]	3.85[6]	3.85[3]			3.85[6]				3.85[3]	3.95[3]		
SHEETS Hot-rolled (18 ga. & hvr.)	3.35[1,5,9,15]	3.35[23]	3.35[1,6,8]	3.35[4,5]			3.35[1,4,6] 3.75[13]		3.35[3]	3.60[26]		3.35[3]	4.05[22]	3.55[12] 4.15[47]
Cold-rolled	4.10[1,5,7,9,15] 5.10[63]		4.10[1,6,8]	4.10[4,15]		4.10[7]	4.10[4,6]		4.10[3]			4.10[3]	4.80[22]	4.30[12]
Galvanized (10 gage)	4.40[1,9,15]		4.40[1,8]		4.40[4]		4.75[44] 5.50[54]					4.40[3]		
Enameling (12 gage)	4.40[1]		4.40[1,8]	4.40[4]		4.40[7]	4.40[6] 4.90[76] 5.55[64]						5.10[22]	4.70[12]
Long ternes (10 gage)	4.80[9,15]		4.80[1]			4.80[7]	5.30[64]							
Hi Str. low alloy, h.r.	5.05[1,5,9]	5.05[1]	5.05[1,6,8]	5.05[4,5]			5.05[1,4] 5.30[6] 5.40[13]		5.05[3]	5.05[26]		5.05[3]		5.25[12]
Hi str. low alloy, c.r.	6.20[1,5,9]		6.20[1,6,8]	6.20[4,5]			6.20[4,6] 6.45[6]		6.20[3]			6.20[3]		6.40[12]
Hi str. low alloy, galv.	6.75[1]											6.75[3]		
STRIP Hot-rolled	3.25[5,7,9] 3.50[28,41]	3.25[3,66]	3.25[1,6,8]	3.25[5]			3.25[1,4,6] 3.73[13]		3.25[3]	3.50[26]		3.25[3]		3.45[12] 4.05[47]
Cold-rolled	4.15[5,7,9] 4.85[63]	4.30[5] 4.50[68]	4.30[6]	4.15[2,5]		4.15[7]	4.15[1,6,48] 4.50[40] 4.85[13] 4.73[19]		4.15[3]			4.15[3]		4.35[12] 4.75[58] 4.95[47] 5.10[81]
Hi str. low alloy, h.r.	4.95[9]		4.95[1,6,8]	4.95[5]			4.95[1,4] 5.20[6] 5.30[13]		4.95[3]	4.95[26]		4.95[3]		5.15[12]
Hi Str. low alloy, c.r.	6.20[9]			6.20[2,5]			6.20[4] 6.45[6] 6.55[13]		6.40[3]			6.40[3]		6.40[12]
TINPLATE† Cokes, 1.50-lb base box 1.25 lb, deduct 20¢	$7.50[1,5,9,15]		$7.50[1,5,8]				$7.50[4]					$7.60[3]	$7.70[23]	
Electrolytic 0.25, 0.50, 0.75 lb box	Deduct $1.15, 90¢ and 65¢ respectively from 1.50-lb coke base box price													
BLACKPLATE, 29 gage Hollowware enameling	5.30[1,5,15]		5.30[1,6]				5.30[4]					5.40[3]	5.50[22]	
BARS Carbon steel	3.45[1,5,9]	3.45[1,4,23]	3.45[1,6,8]	3.45[4]	3.45[4]		3.45[1,4,6]		3.45[3,4]		3.45[3]			3.65[12]
Reinforcing‡	3.45[1,5]	3.45[4]	3.45[1,6,8]	3.45[4]			3.45[1,4,6]		3.45[3,4]		3.45[3]	3.45[3]		
Cold-finished	4.15[2,4,5,17,52,69,71]	4.15[2,23,69,70]	4.15[4,73,74]	4.15[2,61]	4.15[4,33,52]		4.15[6,40,57]		4.15[70]					4.35[12] 4.30[64]
Alloy, hot-rolled	3.95[1,17]	3.95[1,4,23]	3.95[1,6,8]		3.95[4]		3.95[1,6,25]	3.95[3]	3.95[3,4]		3.95[3]			4.25[12] 4.10[31]
Alloy, cold-drawn	4.90[2,17,52,69,71]	4.90[2,23,69,70]	4.90[4,73,74]	4.90[2,61]	4.90[4,33,52]		4.90[6,25,57]	4.90[3]	4.90[3,70]					5.05[64]
Hi str. low alloy, h.r.	5.20[1,5]		5.20[1,6,8]	5.20[4]			5.20[1] 5.45[6]	5.20[3]	5.20[3]		5.20[3]			5.40[12]
PLATE Carbon steel	3.50[1,5]	3.50[1]	3.50[1,6,8]	3.50[4]			3.50[1] 3.75[13]		3.50[3]	3.75[26]	3.50[3]	3.50[3]	4.20[22]	3.75[12]
Floor plates	4.55[1]	4.55	4.55[3]	4.55[3]						4.55[26]				
Alloy	4.40[1]	4.40[1]	4.40[1]				4.75[13]			4.55[26]	4.40	4.40[3]		
Hi Str. low alloy	5.35[1,5]	5.35[1]	5.35[1,3]	5.35[4,5]			5.60[6] 5.70[13]			5.35[26]	5.35[3]	5.35[3]		5.60[12]
SHAPES, Structural	3.40[1,5,9]	3.40[1,23]	3.40[1,6,8]					3.45[3]	3.45[3]		3.45[3]			
Hi str. low alloy	5.15[1,5]	5.15[1]	5.15[1,6,8]				5.40[6]	5.20[3]	5.20[3]		5.20[3]			
MANUFACTURERS' WIRE Bright	4.50[2,5] 4.75[18]	4.50[2,4,12,34] 4.85[33]		4.50[2,77]			4.50[6]	Kokomo—4.60[39]			4.50[3]	4.60[3]	Duluth—4.50[2] Pueblo—4.75[14]	
PILING, Steel Sheet	4.20[1,9]	4.20[1]							4.20[3]					

STEEL PRICES

Smaller numbers indicate producing companies. See key at right. Prices are in cents per lb unless otherwise noted. Extras apply.

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana		
			F=$76.00		INGOTS Carbon forging, net ton
	$59.00[83]		F=$77.00		Alloy, net ton
		$53.00[11]	F=$72.00[19]		BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton
	$71.00[83]	$63.00[11]	F=$82.00[19]	Geneva=$63.00[16]	Carbon forging billets, net ton
	$74.00[83]		F=$85.00[19]		Alloy net ton
					PIPE SKELP
	4.25[83]	3.85[11]	SF=4.50[24] LA=4.65[24,62]	Portsmouth=3.85[20] Worcester=4.15[2]	WIRE RODS
		3.35[4,11]	SF, LA=4.05[24] F=4.25[19]	Ashland=3.35[7] Niles=3.50[64], Geneva=3.45[16]	SHEETS Hot-rolled (18 ga. & hvr.)
		4.10[11]	SF=5.05[24] F=5.00[19]		Cold-rolled
		4.40[4,11]	SF, LA=5.15[24]	Ashland=4.40[7] Kokomo=4.50[30]	Galvanized (10 gage)
		4.40[11]			Enameling (12 gage)
					Long ternes (10 gage)
		5.05[11]	F=6.00[19]		Hi str. low alloy, h.r.
			F=7.05[19]		Hi str. low alloy, c.r.
					Hi str. low alloy, galv.
3.85[83]	3.65[83]	3.25[11]	SF, LA=4.00[24,62] F=4.40[19], S=4.25[62]	Ashland=3.25[7] Atlanta=3.40[65] New Britain=3.75[58]	STRIP Hot-rolled
			F=5.75[19] LA=5.85[27]	New Haven=4.65[3], 5.00[68] Trenton=5.00[45] New Britain=4.85[58]	Cold-rolled
		4.95[11]	F=5.90[19]		Hi str. low alloy, h.r.
			F=6.95[19]		Hi str. low alloy, c.r.
		7.60[11]	SF=8.25[24]		TINPLATE Cokes, 1.50-lb base box 1.25 lb, deduct 20¢
Deduct $1.15, 90¢ and 65¢ respectively from 1.50-lb coke base box price					Electrolytic 0.25, 0.50, 0.75 lb box
					BLACKPLATE, 29 gage Hollowware enameling
4.05[83]	3.85[83]	3.45[4,11]	SF, LA=4.15[24] LA=4.15[62]	Atlanta=3.60[65]	BARS Carbon steel
4.05[83]	3.85[83]	3.45[4,11]	SF, S=4.20[62] F=4.10[19]	Atlanta=3.60[65]	Reinforcing‡
				Putnam, Newark=4.55[69]	Cold-finished
4.55[83]	4.35[83]		LA=5.00[62] F=4.95[19]		Alloy, hot-rolled
				Newark,[69] Worcester[2]=5.20 Hartford=5.20[4]	Alloy-, cold-drawn
		5.20[11]	F=6.25[19]		Hi str. low alloy, h.r.
	3.90[83]	3.50[4,11]	F=4.10[19] S=4.40[62] Geneva=3.50[16]	Claymont=3.90[29] Coatesville=3.90[21] Harrisburg=4.25[36]	PLATE Carbon steel
				Harrisburg=5.25[36]	Floor plates
			F=5.40[19]	Coatesville=4.80[21]	Alloy
		5.35[11]	F=5.95[19]	Geneva=5.35[16]	Hi str. low alloy
4.00[83]	3.80[83]	3.40[11]	SF=3.95[62] LA=4.00[24,62]	Phoenixville=4.25[56] Geneva=3.40[16]	SHAPES, Structural
		5.15[11]	F=4.00[19] S=4.05[62]	Fontana=5.75[19] Geneva=5.15[16]	Hi str. low alloy
5.10[83]	4.90[83]	4.50[4,11]	SF, LA=5.45[24,62]	Portsmouth=4.50[20] Worcester=4.80[2]	MANUFACTURERS' WIRE Bright

Notes: †Special coated mfg ternes deduct $1.15 from 1.50-lb coke base box price. Can-making quality blackplate, 55 to 128-lb, deduct $1.90 from 1.50-lb coke base box. ‡Straight lengths only from producer to fabricator.

KEY TO STEEL PRODUCERS

With Principal Offices

1 Carnegie-Illinois Steel Corp., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Armco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R. R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va.
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Steel Corp., Oakland, Calif.
20 Portsmouth Div., Detroit Steel Corp., Detroit
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill.
23 Wisconsin Steel Co., South Chicago, Ill.
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Calif. Cold Rolled Steel Corp., Los Angeles
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Worth Steel Co., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., St. Louis
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Iron & Steel Co., Harrisburg, Pa.
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa.
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio*
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
44 Reeves Steel & Mfg. Co., Dover, Ohio
45 John A. Roebling's Sons Co., Trenton, N. J.
46 Simonds Saw & Steel Co., Fitchburg, Mass.
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52 Superior Drawn Steel Co., Monaca, Pa.
53 Tremont Nail Co., Wareham, Mass.
54 Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
55 Ingersoll Steel Div., Chicago
56 Phoenix Iron & Steel Co., Phoenixville, Pa.
57 Fitzsimmons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
60 American Cladmetals Co., Carnegie, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel Corp., San Francisco
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wyckoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Hammond, Ind.
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forging Corp., Chicago
80 Driver Harris Co., Harrison, N. J.
81 Detroit Tube & Steel Div., Detroit
82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
83 Sheffield Steel Corp., Kansas City
84 Plymouth Steel Co., Detroit

*Add 10 pct to quoted prices

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	13.75	14.50	16.00	15.50	23.75	19.25	21.00	12.25	14.25	12.50
Slabs, billets, rerolling	18.00	19.25	21.25	20.25	31.25	25.50	27.75	16.50	19.50	16.25
Forg. discs, die blocks, rings	32.00	32.00	34.50	33.50	50.50	38.00	42.50	26.00	26.50	26.50
Billets, forging	25.75	25.75	27.75	27.00	40.50	30.50	34.25	21.00	21.50	21.50
Bars, wire, structurals	30.00	30.00	32.50	31.50	47.50	35.50	40.00	24.50	25.00	25.00
Plates	32.00	32.00	34.00	34.00	50.50	39.50	44.00	26.00	26.50–27.00	26.50
Sheets	39.00	39.00	41.00	41.00	54.50	47.00	51.50	34.50	35.00	37.00
Strip, hot-rolled	25.50	27.00	31.25	29.00	47.25	35.75	40.00	22.50	29.25	23.00
Strip, cold-rolled	32.00	34.50	38.00	36.50	56.50	46.00	50.00	28.50	35.00	29.00

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38, 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Ft. Wayne, nd., 67; Lockport, N. Y., 46.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38; W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 80; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, 13; Butler, Pa., 7.

Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1; Syracuse N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42; *Ft. Worth, Ind., 67.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Ft. Wayne, Ind., 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44.

Plates: Brackenridge, Pa., 28; Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks, rings: Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28.

Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1.

* Add 10 pct to quoted prices.

ELECTRICAL SHEETS

22 gage, HR cut lengths, f.o.b. mill

	Cents per lb.
Armature	*6.20
Electrical	*6.70
Motor	*7.95
Dynamo	8.75
Transformer 72	9.30
Transformer 65	9.85
Transformer 58	10.55
Transformer 52	11.35

PRODUCING POINTS—Beech Bottom, W. Va., 15; Brackenridge, Pa., 28; Follansbee, W. Va., 63; Granite City, Ill., 22*; add 70¢; Indiana Harbor, Ind., 8; Mansfield, Ohio, 75; Niles, Ohio, 64, add 30¢; Vandergrift, Pa., 1; Warren, Ohio, 4; Zanesville, Ohio, 7.

MERCHANT WIRE PRODUCTS

	Base Column Pittsburg,	
To dealers, f.o.b. mill		*Calif.*
Std. & coated nails*§§‡	106	125§
Woven wire fence†§§‡	116	139
Fence posts, carloads††	116	...
Single loop bale ties‡	113	137
Gal. barbed wire**§§	126	146
Twisted barbless wire	126	146

* Pgt., Chi., Duluth; Worchester, 6 columns higher; Houston, 8 columns higher; Kansas City, 12 columns higher †15½ gage and heavier. §§Aliquippa 4 col. higher. ††Duluth, Joliet; Johnstown, 112. ‡Sterling, Ill., 6 columns higher; ‡‡Sterling, Ill., 2 columns higher.

	Base per 100 lb	*Pittsburg, Calif.*
Merch. wire annld.‡§§	$5.35	$6.30
Merch. wire galv.‡	5.60	6.55
Cut nails, carloads‡‡	6.75	...

‡Add 30¢ at Worcester; 20¢ at Chicago; 10¢ at Sparrows Pt. ‡‡Less 20¢ to jobbers. §Torrance 126. §§Aliquippa add 20¢.

PRODUCING POINTS — *Standard, Coated or galvanized nails, woven wire fence, bale ties, and barbed wire:* Alabama City, Ala., 4; Atlanta, 65; Aliquippa, Pa., (except bale ties), 5; Bartonville, Ill. (except bale ties), 34; Chicago, 4; Donora, Pa., 2; Duluth, 3; Fairfield, Ala., 11; Johnstown, Pa. (except bale ties), 3; Joliet, Ill., 2; Kokomo, Ind., 30; Minnequa, Colo., 14; Monessen, Pa. (except bale ties), 18; Pittsburg, Calif., 24; Portsmouth, Ohio, 20; Rankin, Pa., (except bale ties), 2; Sparrows Point (except woven fence), 3; Sterling, Ill., 33; San Francisco (except nails and woven fence), 14; Torrance, Calif. (nails only), 24; Worcester (nails only), 2; Houston (except bale ties), 83; Kansas City, 83.

Fence Posts: Duluth, 2; Johnstown, Pa., 3; Joliet, Ill., 2; Minnequa, Colo., 14; Moline, Ill., 4; Williamsport, Pa., 51.

Cut nails: Wheeling, W. Va., 15; Conshohocken, Pa., 26; Warehame, Mass., 53.

RAILS, TRACK SUPPLIES

f.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb	$3.40
Joint bars, per 100 lb	4.40
Light rails, per 100 lb	3.75

	Base Price cents per lb
Track spikes†	5.60
Axles	5.25
Screw spikes	8.60
Tie plates	4.20
Pittsburg, Torr., Calif.; Seattle	4.35
Track bolts, untreated	8.85
Track bolts, heat treated, to railroads	9.10

†Kansas City, 5.85¢.

PRODUCING POINTS—*Standard rails:* Bessemer, Pa., 1; Ensley, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Minnequa, Colo., 14; Steelton, 3.

Light rails: All the above except Indiana Harbor and Steelton, plus Fairfield, Ala., 11; Johnstown, 3; Minnequa, 14.

Joint bars: Bessemer, Pa., 1; Fairfield, Ala., 11; Indiana Harbor, Ind., 8; Joliet, Ill., 1; Lackawanna, N. Y., 3; Steelton, Pa., 3; Minnequa, Colo., 14.

Track spikes: Indiana Harbor, Ind., 6, 8; Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 5; Chicago, 4; Struthers, 6; Youngstown, 4.

Track bolts: Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 77, 78.

Axles: Indiana Harbor, Ind., 79; Johnstown, Pa., 3.

Tie plates: Fairfield, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Pittsburg, Calif., 24; Seattle, 62; Steelton, Pa., 3; Torrance, Calif., 24; Minneona, Colo., 14.

Numbers after producing points correspond to steel producers. See key on Steel Price page.

PIPE AND TUBING

Base discounts, f.o.b. mills
Base price about $200.00 per net ton

Standard, T & C

Steel, Buttweld*

	Black	*Galv*
⅛-in.	40½ to 38½	21 to 18½
¼-in.	43½ to 41½	25 to 21½
1-in.	46 to 44	28 to 22
1¼-in.	46½ to 44½	28½ to 23
1½-in.	47 to 45	29 to 23½
2-in.	47½ to 45½	29½ to 24
2½ to 3-in.	48 to 46	30 to 27

Steel, Lapweld

2-in.	38	16½
2½ to 3-in.	42	21
3½ to 6-in.	43 to 40	22 to 21½

Steel, seamless

2-in.	36	17½ to 14½
2½ to 3-in.	39	20½ to 18
3½ to 6-in.	41	22½ to 20

Wrought iron, buttweld

⅛-in.	+26½	+58½
¼-in.	+16½	+47½
1 & 1¼-in.	+10½	+38½
1½-in.	+ 4½	+35
2-in.	+ 4	+34½

Wrought iron, lapweld

2-in.	+13½	+42½
2½ to 3½-in.	+11	+38
4-in.	+ 6	+32
4½ to 8-in.	+ 8	+33½
9 to 12-in.	+18	+43

Extra Strong, Plain Ends

Steel, buttweld

½-in.	39½ to 37½	21½ to 17½
¾-in.	43½ to 41½	25½ to 21½
1-in.	45½ to 43½	28½ to 23½
1¼-in.	46 to 44	29 to 24½
1½-in.	46½ to 44½	29½ to 25
2-in.	47 to 45	30 to 25½
2½ to 3-in.	47½ to 45½	30½ to 23½

Steel, lapweld

2-in.	37	15½
2½ to 3-in.	42	21
3½ to 6-in.	44½ to 41½	23½ to 24

Steel, seamless

2-in.	35	17½ to 14½
2½ to 3-in.	38	21½ to 18
3½ to 6-in.	42½	25 to 20

Wrought iron, buttweld

½-in.	+22	+52½
¾-in.	+15½	+45½
1 to 2-in.	+ 5½	+34½

Wrought iron, lapweld

2-in.	+10½	+39
2½ to 4-in.	+ 1	+27½
4½ to 6-in.	+ 5	+32
7 & 8-in.	list	+27
9 to 12-in.	+11½	+35

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. On buttweld, lapweld steel pipe, jobbers are granted a discount of 5 pct.

* Fontana, Calif., deduct 11 points from figures in left columns.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut lengths 10 to 24 ft inclusive.

OD in.	gage BWG	Seamless H.R.	Seamless C.R.	Electric H.R.	Weld C.D.
2	13	$20.61	$24.24	$19.99	23.51
2½	12	27.71	32.58	26.88	31.60
3	12	30.82	36.27	29.90	35.18
3½	11	38.52	45.38	37.36	43.99
4	10	47.82	56.25	46.39	54.56

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, dollars per 100 lb. (Metropolitan area delivery, add 20¢ to base price except Birmingham, San Francisco, Cincinnati, New Orleans, St. Paul (*), add 15¢; Philadelphia, add 25¢, Chicago, add 30¢).

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (16 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140 Ann.
Baltimore	5.15	6.39[1]	6.65[3] 6.85	5.59– 5.69[11]	....	5.40– 6.04[11]	5.69	5.59	6.19	9.89	9.99	11.12	11.49
Birmingham*	5.15[10]	5.95	6.15[7]	5.10	....	5.55	5.25	5.10	5.65	....	....	....	....
Boston	5.75	6.55[10]	6.95[3] 7.14	5.70	6.90– 6.95	6.08	5.75	5.60	6.19– 6.69	9.70– 9.97	9.80– 10.00	11.15	11.49
Buffalo	5.15	5.95	6.94	5.41	7.27	5.65	5.35	5.15	5.75	9.80	9.90	11.05	11.35
Chicago*	5.15	6.20	6.95	5.10	6.30	5.40	5.25	5.10	5.65	9.25	9.55	10.70	11.00
Cincinnati*	5.42– 5.97	5.99– 6.24	6.39	5.35	....	5.79	5.64	5.35– 5.54	5.95– 6.25	9.60– 9.81	9.90– 10.11	11.05– 11.26	11.35– 11.56
Cleveland	5.15	5.95	7.00– 7.10	5.24	6.35	5.52	5.37	5.12	5.75	9.30	9.60	10.81	11.11
Detroit	5.33	6.08– 6.33	7.09	5.49	6.43– 6.80	5.59 5.79	5.64– 5.68	5.39	5.91	9.58	9.88	11.01	11.31
Houston	6.00	....	....	6.10	....	6.00	5.95	6.10	7.80	10.35– 10.45	10.50– 10.60	11.50	11.95 12.10
Indianapolis	....	....	....	....	7.30	....	....	....	6.15	....	....	....	....
Kansas City	5.75	6.55[10]	7.55	5.70	8.95	6.00	5.85	5.70	6.35	9.85	10.15	11.30	11.60
Los Angeles	5.90	7.45	7.70[2]	5.95	8.70[16]	6.00	5.90	5.90	7.55	10.75	10.75	12.45	12.75
Memphis	5.93	6.68	....	5.98	6.80– 6.81	6.08	5.93	5.68	6.51	....	....	....	....
Milwaukee	5.29	6.09	6.94– 6.99	5.24	6.32	5.54	5.39	5.24	5.89	9.39	9.69	10.84	11.14
New Orleans*	5.80[1]	6.75 6.85[1]	....	5.55[1]	6.80 6.90[1]	5.65	5.55[1]	5.55[1]	6.75 6.80	....	....	....	....
New York	5.52	6.64	7.54[2]	5.84	6.78	5.88	5.65	5.67	6.44	9.60	9.90	11.05	11.35
Norfolk	6.10[13]	7.00	....	6.30[13]	....	6.15[13]	6.20[13]	6.15[13]	7.20[13]	....	....	....	....
Philadelphia*	6.05	6.20– 6.35	6.85[3] 7.25	5.65	6.29	5.65	5.45	5.60	6.21	9.35	9.65	10.80	11.10
Pittsburgh	5.15	5.95	6.60	5.20	5.95– 6.00	5.35	5.25	5.10	5.75	9.25	9.55	10.70	11.00
Portland	6.60– 7.10[1]	8.40[2]	....	8.85[5]	....	8.40[9]	8.50	8.45– 8.45[9]	8.60[14]	12.00[18]	11.80[18]	....	....
Salt Lake City	5.85	6.70	....	7.45	8.75	8.10[3]	5.90	7.35[8]	8.75	....	....	....	....
San Francisco*	6.20	7.60[2]	7.75[2]	6.15	7.85[16]	6.10	6.00	6.00	7.55	10.75	10.75	12.45	12.75
Seattle	6.60[4]	8.15[2]	8.40[2]	6.85[4]	....	6.35[4]	6.20[4]	6.35[4]	8.50[14]	....	11.80[18]	....	13.60[19]
St. Louis	5.48	6.28	7.18	5.43	7.30	5.73	5.58	5.43	6.08	9.58	9.88	11.03	11.33
St. Paul*	5.71	6.51	7.41	5.66	6.16– 6.82	5.96	5.81	5.66	6.31	9.81	10.11	11.26	11.56

BASE QUANTITIES *(Standard unless otherwise keyed on prices.)*
Hot-rolled sheets and strip, hot rolled bars and bar shapes, structural shapes, plate, galvanized sheets and cold-rolled sheets; 2000 to 9999 lb. Cold-finished bars; 2000 lb or over. Alloy bars: 1000 to 1999 lb.

All HR products may be combined to determine quantity bracket. All galvanized sheets may be combined to determine quantity bracket. CR sheets may not be combined with each other or with galv. sheets to determine quantity bracket.

Exceptions:
(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 to 5999 lb; (6) 1000 lb and over; (7) 500 to 1499 lb; (8) 400 lb and over; (9) 400 to 9999 lb; (10) 500 to 9999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 9999 lb; (16) 6000 lb and over; (17) up to 1999 lb; (18) 1000 to 4999 lb; (19) 1500 to 3499 lb; (20) CR sheets may be combined for quantity; (21) 3 to 24 bundles.

PIG IRON PRICES

Dollars per gross ton. Delivered prices do not include 3 pct tax on freight.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	51.00	51.50	52.00	52.50	.....
Birmingham	45.38	45.88	.....	.....	.....
Buffalo	49.00	49.50	50.00	.....	.....
Chicago	49.00	49.50	49.50	50.00	.....
Cleveland	49.00	49.50	49.50	50.00	54.00
Daingerfield, Tex.	45.00	45.50	45.50	.....	.....
Duluth	49.00	49.50	49.50	50.00	.....
Erie	49.00	49.50	49.50	50.00	.....
Everett	.....	52.25	52.75	.....	.....
Fontana	52.00	52.50	.....	.....	.....
Granite City	50.90	51.40	51.90	.....	.....
Ironton, Utah	48.00	48.50	.....	.....	.....
Pittsburgh	48.00*	.....	.....	47.00	.....
Neville Island	49.00	49.50	49.50	50.00	.....
Geneva, Utah	48.00	48.50	.....	.....	.....
Sharpsville	49.00	49.50	49.50	50.00	.....
Steelton	51.00	51.50	52.00	52.50	57.00
Swedeland	50.00	50.50	51.00	51.50	.....
Toledo	49.00	49.50	49.50	50.00	.....
Troy, N. Y.	51.00	51.50	52.00	.....	57.00
Youngstown	49.00	49.50	49.50	50.00	.....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Producing Point	Rail Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$.60-.80	.....	52.85– 53.05	53.55– 53.75	.....	.....
Boston	Steelton	6.90	.....	.....	.....	.....	60.90
Brooklyn	Bethlehem	4.29	.....	52.79	53.29	53.79	.....
Cincinnati	Birmingham	6.70	52.08	52.58	.....	.....	.....
Jersey City	Bethlehem	2.63	.....	51.13	51.63	52.13	.....
Los Angeles	Geneva-Ironton-Fontana	7.70	53.70	54.20	.....	.....	.....
Mansfield	Cleveland-Toledo	3.33	49.33	49.83	49.83	50.33	54.33
Philadelphia	Bethlehem	2.39	53.39	53.89	54.39	54.89	.....
Philadelphia	Swedeland	1.44	51.44	51.94	52.44	52.94	.....
Philadelphia	Steelton	3.09	54.09	54.59	55.09	55.59	60.09
Rochester	Buffalo	2.63	51.63	52.13	52.63	.....	.....
San Francisco	Geneva-Ironton-Fontana	7.70	53.70	54.20	.....	.....	.....
Seattle	Geneva-Ironton-Fontana	7.70	53.70	54.20	.....	.....	.....
St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	.....	.....
Syracuse	Buffalo	3.58	52.58	53.08	53.58	.....	.....

* *Monessen, $51.00.*

Producing point prices are subject to switching charges; silicon differential (not to exceed 50c per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct for foundry iron); phosphorus differentials, a reduction of 38c per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50c per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.01 to 6.50 pct C/L per g.t., f.o.b. Jackson, Ohio—$57.00; f.o.b. Buffalo, $58.25. Add $1.50 per ton for each additional 0.50 pct Si up to 17 pct. Add 50c per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $62.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $70.50. High phosphorus charcoal pig iron is not being produced.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts, f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)
Base discount

Machine and Carriage Bolts

	Pct Off List Less Case	C.
½ in. & smaller x 6 in. & shorter	23	35
9/16 & ⅝ in. x 6 in. & shorter	26	40
¾ in. & larger x 6 in. & shorter	26	37
All diam. longer than 6 in.	22	34
Lag, all diam, longer than 6 in.	28	39
Lag, all diam x 6 in. & shorter	30	41
Plow bolts	40	—

Nuts, Cold Punched

(Regular Hexagons)

½ in. and smaller	33 43
9/16 to ⅝ in.	30 41
¾ to 1½ in. inclusive	27 38
1⅝ in. and larger	20 32

Semifinished Hexagon Nuts

(Less case lots)

	Pct Off List Reg	Hvy	Lt
½ in. and smaller	41	35	..
9/16 to ⅝ in.	36	29	..
¾ to 1½ in.	31	23	33
1⅝ in. and larger	21	17	..

In full case lots, 15 pct additional discount.

Stove Bolts

	Pct Off List
Packaged, steel, plain finish	63
Packaged, plated finish	50
Bulk, plain finish**	69*

* Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

** Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Large Rivets

(½ in. and larger)
Base per 100 lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa. $7.25

Small Rivets

(7/16 in. and smaller)

	Pct Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	43

Cap and Set Screws

(In bulk)	Pct Off List
Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	58
¼ in. through ⅝ in. x 6 in. and shorter high C heat treated	53
Milled studs	23
Flat head cap screws, listed sizes	24
Fillister head cap, listed sizes	43
Set screws, sq head, cup point, 1 in. diam and smaller x 6 in. and shorter	59

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon	4.50¢
0.41 to 0.60 carbon	5.95¢
0.61 to 0.80 carbon	6.55¢
0.81 to 1.05 carbon	8.50¢
1.06 to 1.35 carbon	10.80¢

Worcester, add 0.30¢; Sharon, New Britain, add 0.35¢.

LAKE SUPERIOR ORES

(51.50% Fe; natural content, delivered lower lake ports)

	Per gross ton
Old range, bessemer	$8.10
Old range, nonbessemer	7.95
Mesabi, bessemer	7.85
Mesabi, nonbessemer	7.70
High phosphorus	7.70

After Jan. 25, 1950, increases or decreases in Upper Lake rail freight, dock handling charges and taxes are for buyers' account.

ELECTRODES

Cents per lb, f.o.b. plant, threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb
	GRAPHITE	
17, 18, 20	60, 72	17.00¢
8 to 16	48, 60, 72	17.00¢
7	48, 60	18.64¢
6	48, 60	19.95¢
4, 5	40	20.48¢
3	40	21.53¢
2½	24, 30	22.05¢
2	24, 30	24.15¢
	CARBON	
40	100, 110	7.65¢
35	65, 110	7.65¢
30	65, 84, 110	7.65¢
24	72 to 104	7.65¢
20	84, 90	7.65¢
17	60, 72	7.65¢
14	60, 72	8.16¢
10, 12	60	8.42¢
8	60	8.67¢

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct, Coatesville, Pa. (21)	*28.00	
Washgtn, Pa. (39)	*28.00	
Claymont, Del. (29)	*28.00	
Conshohocken, Pa. (26)		*24.00
New Castle, Ind. (55)	*26.50	*25.50
Nickel-carbon 10 pct, Coatesville (21)	31.00	
Inconel-carbon 10 pct, Coatesville (21)	39.00	
Monel-carbon 10 pct, Coatesville (21)	32.00	
No. 302 Stainless-copper-stainless, Carnegie, Pa. (60)		75.00
Aluminized steel sheets, hot dip, Butler, Pa. (7)		7.75

* Includes annealing and pickling, or sandblasting.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.00
18	4	1	—	5	$1.565
18	4	2	—	—	$1.13
1.5	4	1.5	8	—	71.5¢
6	4	2	6	—	76.5¢

High-carbon-chromium	57.5¢
Oil hardened manganese	32¢
Special carbon	29.5¢
Extra carbon	24.5¢
Regular carbon	21¢

Warehouse prices on and east of Mississippi are 3¢ per lb higher. West of Mississippi, 5¢ higher.

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.00 to $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.50 to $17.00
Foundry, oven coke	
Buffalo, del'd	$25.35
Chicago, f.o.b.	21.00
Detroit, f.o.b.	23.00
New England, del'd	23.40
Seaboard, N. J., f.o.b.	22.00
Philadelphia, f.o.b.	22.10
Swedeland, Pa., f.o.b.	22.00
Painesville, Ohio, f.o.b.	23.25
Erie, del'd	$22.29 to 22.50
Cleveland, del'd	22.62
Cincinnati, del'd	22.71
St. Paul, f.o.b.	21.00
St. Louis, f.o.b.	24.90
Birmingham, del'd	20.79

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill. Base price, per ton net; Effective CaF, content:

70% or more	$41.00
60% or less	38.00

REFRACTORIES

Fire Clay Brick *(F.o.b. works)*

	Carloads, Per 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5)	$94.60
No. 1 Ohio	88.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	$8.00
No. 2 Ohio	79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	13.75

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$94.60
Childs, Pa.	99.00
Hays, Pa.	100.10
Chicago District	104.50
Western Utah and Calif.	111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago	111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	16.50
Silica cement, net ton, bulk, Hays, Pa.	18.70
Silica cement, net ton, bulk, Ensley, Ala.	17.60
Silica cement, net ton, bulk, Chicago District	17.60
Silica cement, net ton, bulk, Utah and Calif.	24.75

Chrome Brick *Per Net Ton*

Standard chemically bonded, Balt., Chester	$77.00

Magnesite Brick

Standard, Baltimore	$99.00
Chemically bonded, Baltimore	88.00

Grain Magnesite *St. ⅜-in. grains*

Domestic, f.o.b. Baltimore, in bulk fines removed	$62.70
Domestic, f.o.b. Chewelah, Wash., in bulk	36.30
in sacks	41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢ $13.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	7.4¢ to 9.0¢
Canadian sponge iron, del'd, in East	10.00¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	36.0¢ to 39.5¢
Electrolytic iron unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	70.0¢ to $1.35
Aluminum	29.00¢
Brass, 10 ton lots	30.00¢ to 33.25¢
Copper, electrolytic	10.25¢ plus metal value
Copper, reduced	10.00¢ plus metal value
Cadmium 100-199 lb	95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity	$3.50
Lead	6.5¢ plus metal value
Manganese	52.00¢
Molybdenum, 99%	$2.65
Nickel, unannealed	75.5¢
Nickel, annealed	81.5¢
Nickel, spherical, unannealed	78.5¢
Silicon	34.00¢
Solder powder	6.5¢ to 8.5¢ plus met. value
Stainless steel, 302	75.00¢
Tin	11.00¢ plus metal value
Tungsten, 99%	$3.40
Zinc, 10 ton lots	20.50¢ to 23.85¢

CAST IRON WATER PIPE

Per net ton

6 to 24-in., del'd Chicago	$95.30 to $98.80
6 to 24-in., del'd N .Y.	94.50 to 95.50
6 to 24-in., Birmingham	81.50 to 86.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	$108.50 to $113.00

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si.)

0.06% C	28.75	0.20% C	27.75
0.10% C	28.25	0.50% C	27.50
0.15% C	28.00	1.00% C	27.25
2.00% C			27.00
65-69% Cr, 4-9% C			20.50
62-66% Cr, 4-6% C, 6-9% Si.			21.35

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% Max. C.	$1.09
0.50% max. C.	1.05
.00 min. C	1.04

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 20.50¢ per lb of contained Cr plus 11.30¢ per lb of contained Si.

Bulk 1-in. x down, 20.65¢ per lb contained Cr plus 11.50¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CM5Z

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	19.75
Less ton lots	21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.00¢
Ton lots to carload packed	18.00¢
Less ton lots	19.50¢

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

Prices Continued on Page 270

FERROALLOYS

Ferromanganese

78-82% Mn. maximum contract base price, gross ton, lump size.

F.o.b. Birmingham	$174
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont.	$172
F.o.b. Johnstown, Pa.	$174
F.o.b. Sheridan, Pa.	$172
F.o.b. Etna, Clairton, Pa.	$175

$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.45
Ton lots	12.05

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$64.00	$65.00
Pgh. or Chicago	65.00	66.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, packed	29.75
Ton lots	31.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	28
Ton lots	30
Less ton lots	32

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb. of contained Mn ..... 18.15¢

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	25.25	27.10	28.30
0.10% max. C	24.75	26.60	27.80
0.15% max. C	24.25	26.10	27.30
0.30% max. C	23.75	25.60	26.80
0.50% max. C	23.25	25.10	26.30
0.75% max. C, 7.00% max. Si	20.25	22.10	23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk	8.95
Ton lots	10.60
Briquet, contract basis carlots, bulk delivered, per lb of briquet	10.30
Ton lots	11.90

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $82.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $80.00. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	20.70
97% Si, 1% Fe	21.10

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk	6.30
Ton lots	7.90

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si	17.00	75% Si	13.50
50% Si	11.30	85% Si	14.65
90-95% Si			16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Other Ferroalloys

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	7.65¢
Ton lots	9.05¢
Calcium molybdate, 45-40%, f.o.b. Langeloth, Pa., per pound contained Mo	96¢
Ferrocolumbium, 50-60%, 2 in x D, contract basis, delivered, per pound contained Cb.	
Ton lots	$3.50
Less ton lots	3.55
Ferro-Tantalum-columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta	$2.67
Ferromlybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo	$1.13
Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton	$65.00
10 tons to less carload	75.00
Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	$1.28
Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	$1.40
Less ton lots	$1.45
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton	$167.00
Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	$2.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained V.	
Openhearth	$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa.	95¢
bags, f.o.b. Washington, Pa., Langeloth, Pa.	94¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk, lump	11.00¢
Ton lots, bulk lump	11.50¢
Less ton lots, lump	12.25¢
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2O_5	$1.20
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.	
Carload, bulk	6.60¢

Boron Agents

Contract prices per lb of alloy, del.

Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	$4.25
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed.	
Ton lots, per pound	10.00¢
Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots	$1.20
F.o.b. Wash., Pa.; 100 lb, up	
10 to 14% B	.75
14 to 19% B	1.20
19% min. B	1.50
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	93¢
No. 6	63¢
No. 79	45¢
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.	
Ton lots	$1.46
Less ton lots	1.57
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	$1.80
Silcaz, contract basis, delivered.	
Ton lots	45.00¢

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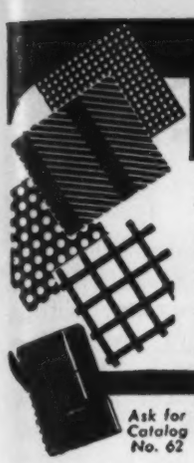

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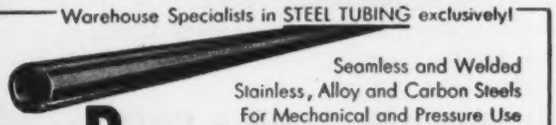

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Adv. on page 105 Aug. 24 Iron Age

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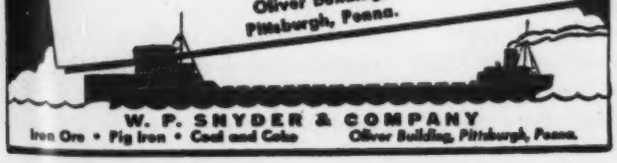

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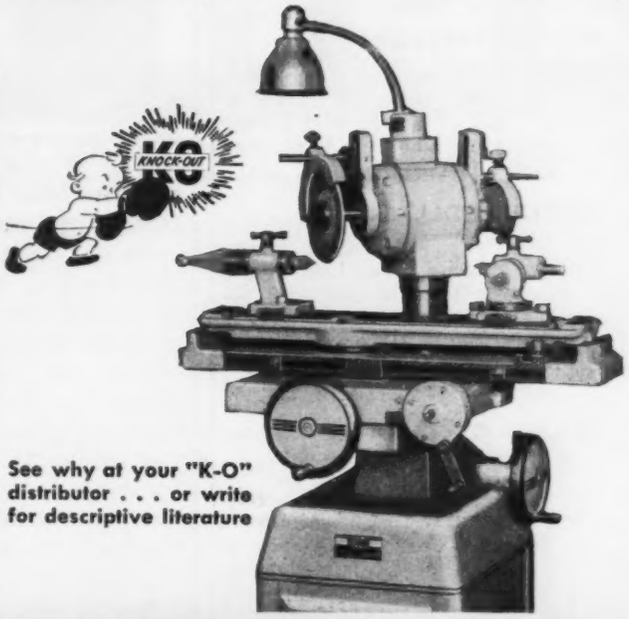

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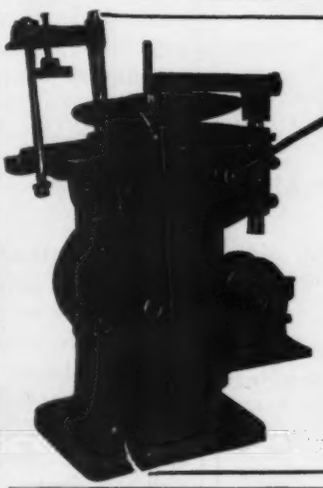

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NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Possible Price Control — The MDNA, NISA, and other trade associations are wisely calling the attention of their members to an executive order under the new Defense Production Act which affects everyone. Its purpose is to form a basis for possible future price control action, when and if needed. The order provides that every person in business during the period from May 24 to June 24, 1950, shall preserve all his records for such period relating to prices received or asked for goods and services, and labor, material, and other costs incurred in relation to such goods or services.

Behind Rising Prices—A contributing factor in the steep climb of machinery prices is the growing tax burden plus the fear of subsequent renegotiation on defense contracts. When inflationary factors are coupled with a critical shortage of manpower for rebuilding, which is growing in machinery centers, and the difficulty of replacing existing equipment, the basis for today's hectic market becomes increasingly clear.

New England NISA — David Sandman of Sandman Electric Co., Boston, was recently elected president of the New England chapter of the National Industrial Service Assn. Other officers elected were: B. L. Whittemore of B. L. Whittemore Co., Framingham, Mass., vice-president; Edward Kolhonen of Peabody Electric Co., Peabody, Mass., secretary; and Harry Bedig of Electric Maintenance Co., Boston, treasurer.

MDNA Standards—At the recent MDNA directors' meeting, new attention was given to affiliation with the American Standards Association. A committee, under the chairmanship of Charles Kempler, was appointed to confer with the ASA, and to reconsider the already proposed standards for three classes of machinery: rebuilt, reconditioned, and as-is. The first meeting of the committee with an ASA representative was held in Chicago on October 6. The standards to be instituted and maintained by the MDNA will be available for consideration and vote by the membership of the MDNA at local chapter meetings soon, prior to official submission to the ASA.

MDNA Meetings—The Detroit chapter of the Machinery Dealers' National Association held its September meeting at the quarters of the Montgomery Engineering Co. J. M. P. Fox, executive director of the MDNA, discussed current business problems. In New York, the MDNA September meeting was held at the Governor Clinton Hotel on September 25. Most of the national directors, who had met in New York earlier in the day, were present.

Chicago NISA — The Central District Chapter of the National Industrial Service Association held a meeting at the Electric Club in Chicago on October 10. The speaker was Joseph F. Ferrari, regional director, who gave a chalk talk on cost factors on T & M jobs as compared to current published prices for rewinds.

Auctions Off — Market reports in recent weeks all point up a reduction in one of the standard ways for used machinery dealers to replenish their stocks: auction sales. Though auction sales have been bringing extremely high prices for late model machinery, the desire to stay in business somehow is strong. Though few of the companies which might normally be going out of business and selling their equipment at auction are yet being bailed out by defense orders, they are more and more tending to hold on, hoping that before long they will be put back in business by defense subcontracts.